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Voted **Magazine of the year**

Industry awards

The Atari logo was once synonymous with the videogame. Could the familiar flared symbol be about to perform a Phoenix-like rebirth? Edge examines the rise, fall and rise of the company that started it all...

Future PUBLISHING

EDGE

Las Vegas CES: the calm before the storm?

With the passing of the Las Vegas CES, the six-monthly ritual that signifies the world's largest gathering of consumer electronics companies could be finally coming to an end. With the summer show first moved to Philadelphia, and then cancelled, the industry can now look forward to a rival event – the E^3 show in LA. And this next show is rather more eagerly awaited than most, with official unveilings of the Saturn, Sony PlayStation and Ultra 64 to The Rest Of The World – ie, anyone outside Japan.

If anything, the Las Vegas CES was something of a disappointment. The lack of quality new games was quite distressing, and there was no single big attraction in the entire show.

Many of the major players found themselves with little to shout about. Nintendo tried hard to make a big thing of *Starfox 2* and, of course, Virtual Boy; similarly, Sega showed its 32X hardware but had no new games to promote. Even the Jaguar's new CD drive had virtually no software to run.

Ironically, one of the biggest crowd-pullers proved to be an import version of *Toh Shin Den* – being shown on a tiny accessories stand – which made a nonsense of the polygon beat 'em ups trying to impress on high-end PCs.

But this enforced hiatus will come to an end when the next-generation machines go global at the end of this year. The CES will at last have something to get excited about again – until the next time the industry decides that the machines it has aren't worth developing for any more.

The **future** is almost here...

inside Edge issue 18

Voted **Magazine of the year** Industry awards

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So, farewell then, Rob.
"I can't believe you haven't finished that yet, Jason!"
That was your catchphrase.

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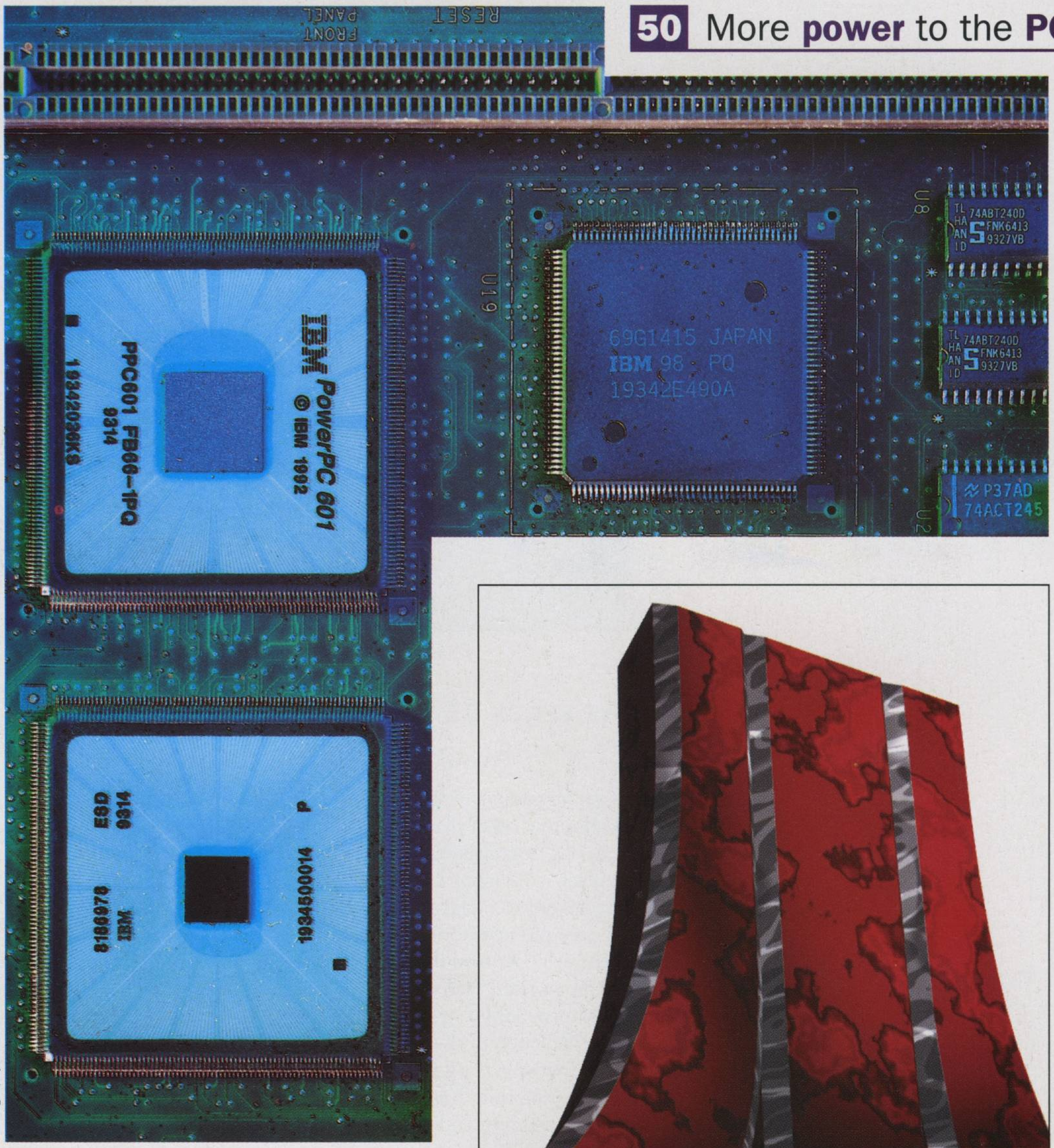

Photography: **Stuart Whale**

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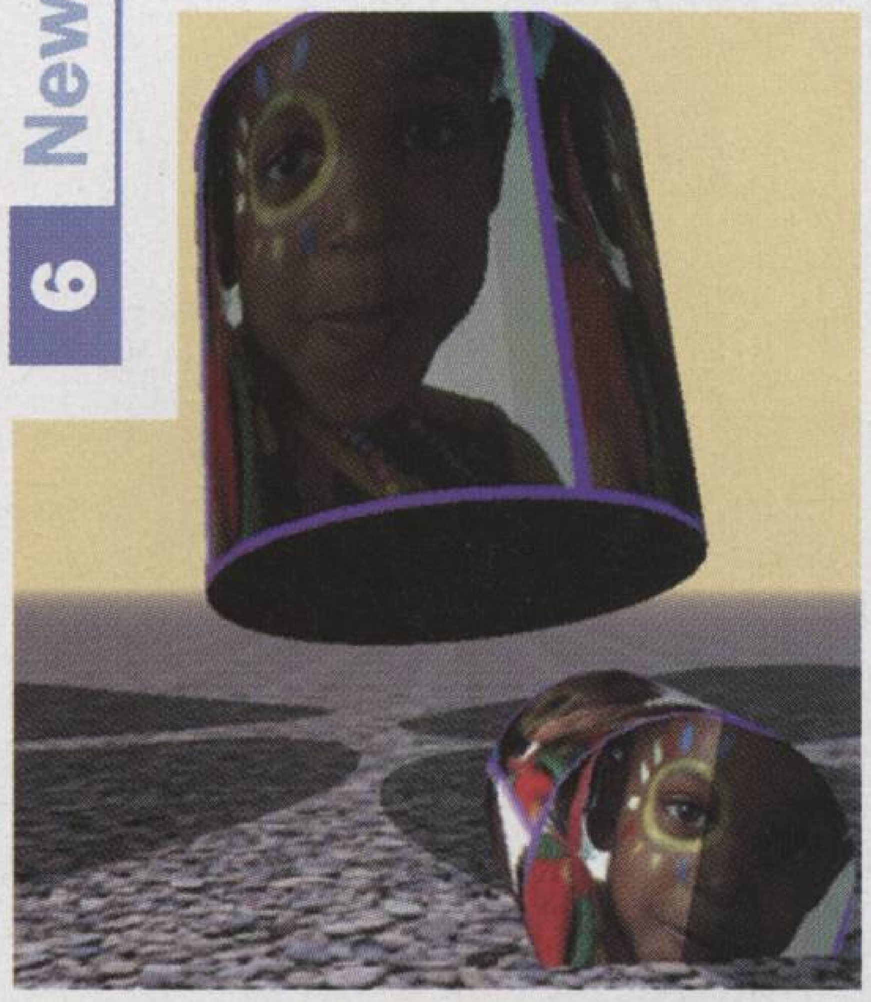

New products from **VideoLogic** (left) and **Apple**

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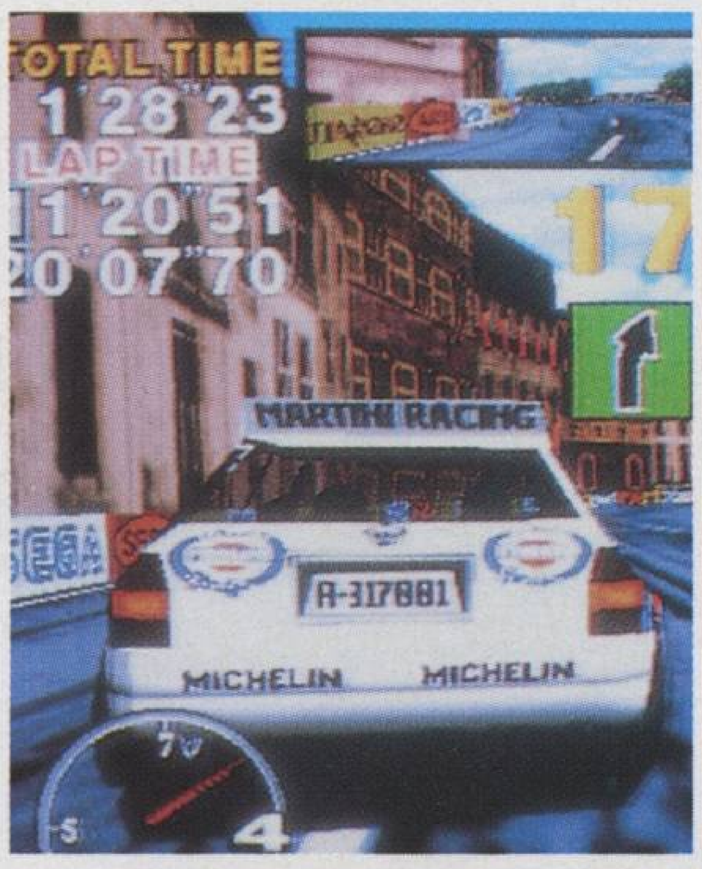

Sega Rally (left) and ***Flight Unlimited***

Clockwork Knight (left) and ***Toshinden***

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Photography: Jason 'I'm at the CES, me' Brookes

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Edge has the first report from the Las Vegas CES: all quiet on the western front? More details emerge on the Apple Pippin. New VideoLogic 3D rendering system aims to become industry standard – Sega interested. Saturn Vs PlayStation: **Edge** compares and contrasts hardware and software

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Edge visits Looking Glass Technology in Boston, Massachusetts. Plus first looks at *Descent* (PC), *Sega Rally* (coin-op), and *Metal Jacket* (PlayStation)

50 More power to the PC

What does the future have in store for the ubiquitous PC? With Pentium and PowerPC vying for your hard cash, the humble beige box is heading towards workstation performance. **Edge** examines the way forward: the increase in processing power, the advent of speech recognition, the opportunities for home VR, and the PC as home entertainment centre

58 Atari: from boom to bust

… And back again. **Edge** reveals the peaks and troughs of the company that started it all. At one point, Atari was the major player in a market worth $6 *billion* – and then made some disastrous business decisions. But now, with a console that's selling, a useful alliance with Sega, and dozens of patent infringements waiting to be resolved, Atari is aiming to be *big* once again

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Toh Shin Den and *Motor Toon GP* show what the Sony PlayStation is *really* made of, and *Clockwork Knight* proves the Saturn isn't a one-hit wonder

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In t'good old days, you could play *Marble Madness* all day and still have change for a cab home etc…

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Gumpei Yokoi, head of R&D1, inventor of the Game Boy and all-round Nintendo visionary

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Edge slices through the mystic rites of technology with the flashing blade of truth

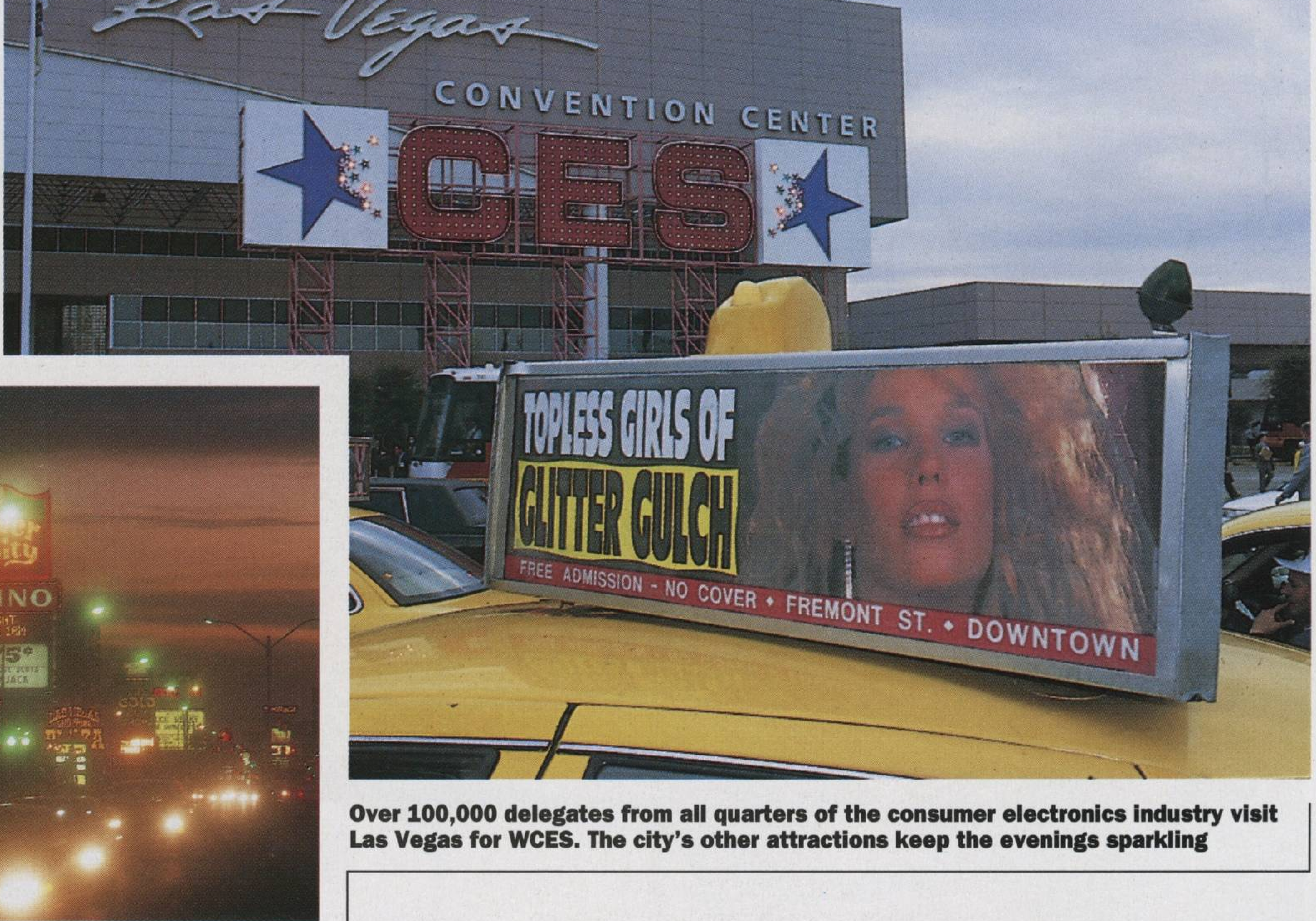
New products fail to materialise at **WCES**/**page6** • Apple branches out: existence of **Pippin** offshoot finally confirmed/**page10** • **PowerVR:** VideoLogic announces low-cost rendering system/**page 12** • **PlayStatio**n v **Saturn**: the next-generation giants face off/**page 14**

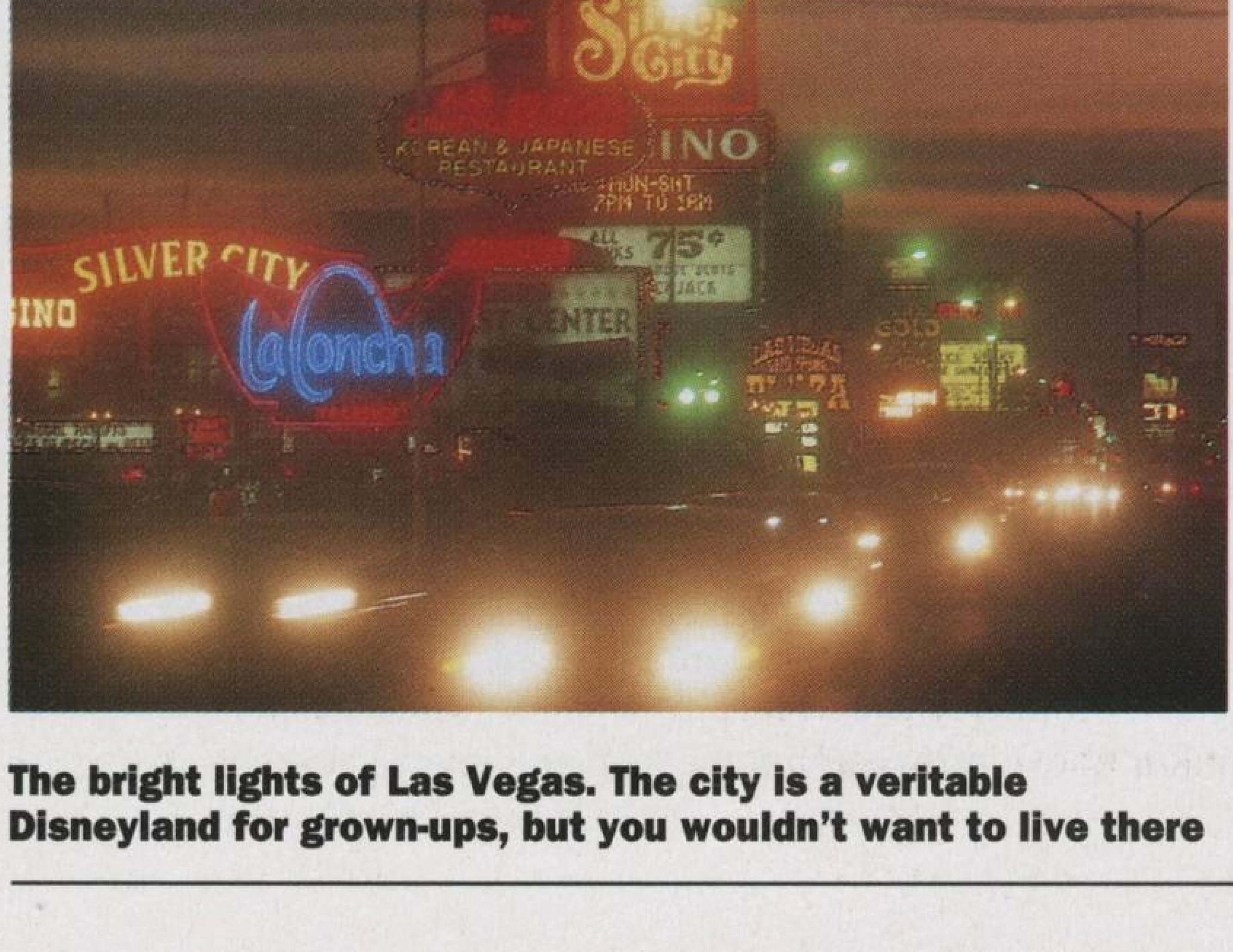
Cutting **Edge**

The latest **news** from the world of interactive entertainment

All show, no go at **Winter CES**

This year, one of the biggest events in the videogames show calendar in fact turned out to be something of a non-event





Over 100,000 delegates from all quarters of the consumer electronics industry visit Las Vegas for WCES. The city's other attractions keep the evenings sparkling

The bright lights of Las Vegas. The city is a veritable Disneyland for grown-ups, but you wouldn't want to live there

Videogames form only a small part of the Winter CES. Despite the lack of major attractions, this year's show was as daunting in size as ever

Nintendo and Sega laid on the glitz (top and centre), while queues formed for Nintendo's 'Virtual Reality System'

Who is it?

This man was pivotal in the early stages of Commodore's US marketing campaign for the ill-fated CDTV. He reputedly earned a huge amount from the then computer giant for promoting the 'multimedia' cause

With its incessant ringing of slot machines, indigestible 'all you can eat for $2.99' buffets and culturally bankrupt nightlife, Las Vegas is the undisputed hedonist capital of the world. It's also the annual venue for the Winter Consumer Electronics Show, which took place in January at the city's colossal Convention Center.

The games industry's share of the CES has grown over the last few years from 15% to almost 30%, with many exhibitors now reduced to taking space inside tents erected at the rear of the centre. This year's show, while understandably quieter than the summer event in Chicago, was the most disappointing of recent years, signalling a period of stagnation in the games community. Next-gen hardware lurked in the shadows far from the prying eyes of journalists and retailers, and exciting new games were genuinely hard to find.

Sega's burgeoning 32X format was primed with *Metal Head*, a textured 3D robot stomp 'em up

Big space takers Sega and Nintendo conspicuously lacked big-name titles. *Starfox 2* was Nintendo's attempt to maintain interest in the SNES, but somehow, despite more varied play mechanics, the prototype game seemed to lack the immediate appeal of its predecessor, relying instead on free-roaming levels (like Argonaut's ageing polygon shooter *Starglider 2*). And those Super FX polygons are unlikely to draw many gasps. Another unimpressive Super FX game was *Comanche*, converted from the PC title and boasting the same Voxel-based graphics. Sadly, on the SNES the low resolution made for a chunky display.

The Ultra 64 was, typically, cloaked in secrecy. Despite claims that the chip was complete, Nintendo's only acknowledgement of its next-generation platform was the announcement of a 'Dream Team' of development partners including SGI, Alias, Rambus, MultiGen, Rare, Williams, Acclaim, Paradigm, Spectrum Holobyte and DMA Design.

Edge spoke to NOA chairman Howard Lincoln and was assured that the system was on schedule and would meet its target price of $250. This is contrary to rumours of wrangles between Nintendo and SGI over the price of the chip (SGI has allegedly set a price at least double what Nintendo is prepared to pay).

The only Nintendo hardware on show was the Virtual Boy previewed at the Shoshinkai show in November.

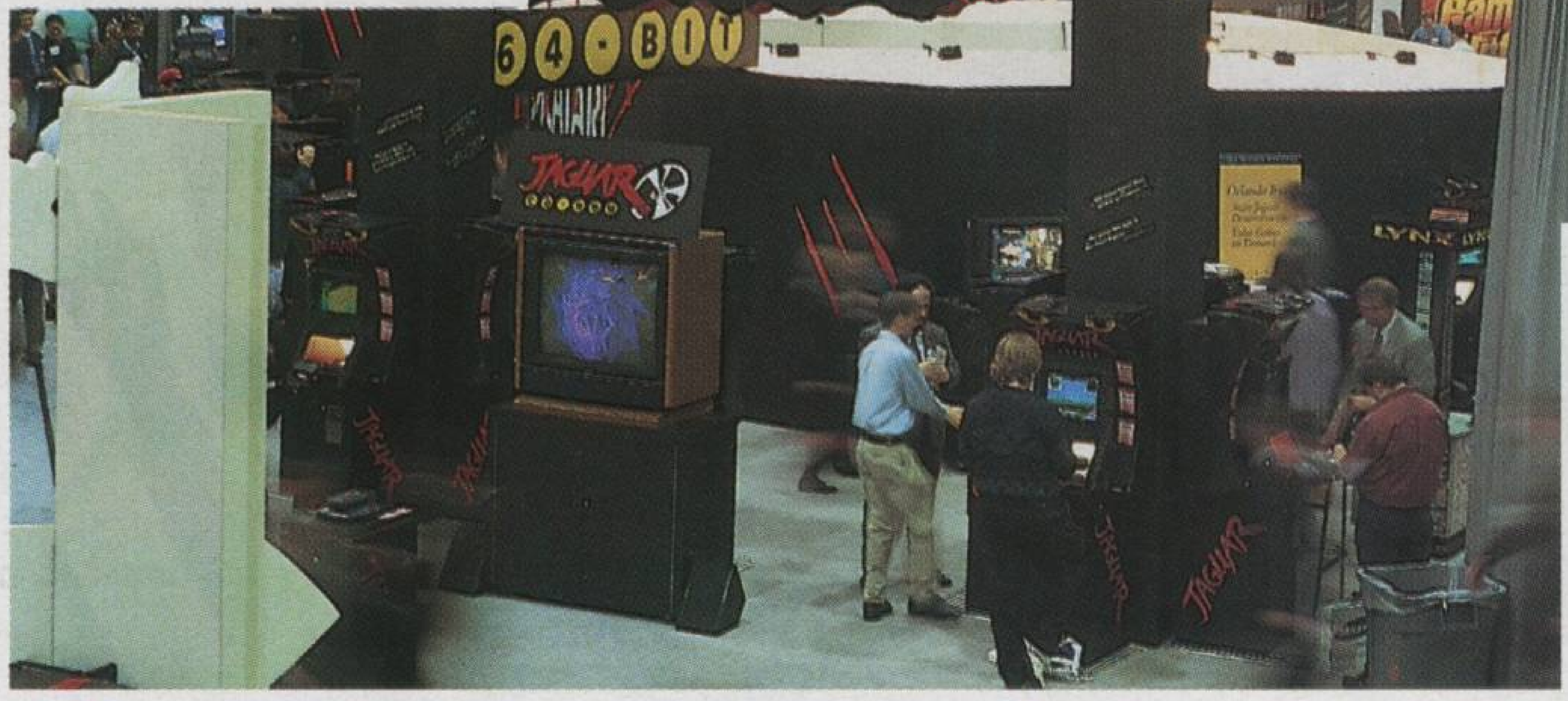
Highlights

Bill Gates' speech about Microsoft's forthcoming *BOB* package proved a major attraction. Its content was actually quite dull, but the entire population of Las Vegas could have been swallowed by the crowd of onlookers.

Alias Research's latest innovation drew a few gasps from experienced SGI artists. Version 6 of *PowerAnimator* now includes the ability to render lifelike hair (something that wasn't even possible in The Flintstones, SFX fans). The technique uses particle systems instead of polygons.

There were numerous social highlights at CES, but few kept a straight face when Philips' Tony Takoushi (CVG, circa 1987) was whisked onto stage and behind a sheet during Penn And Teller's show at Bally's hotel. His task: to make sure that they were both completely naked...

Continued next page



it is...

Nolan Bushnell, co-founder of Atari. In 1991 he showed vigorous enthusiasm for the project, firmly believing that the way forward lay with CD. It is thought he no longer has any connection with Commodore

Atari displayed the Jaguar CD despite the fact that it only had one game running (above). However, the system's video playback was impressive. SNK took a large stand to introduce its Neo-Geo CD to the US market (right)

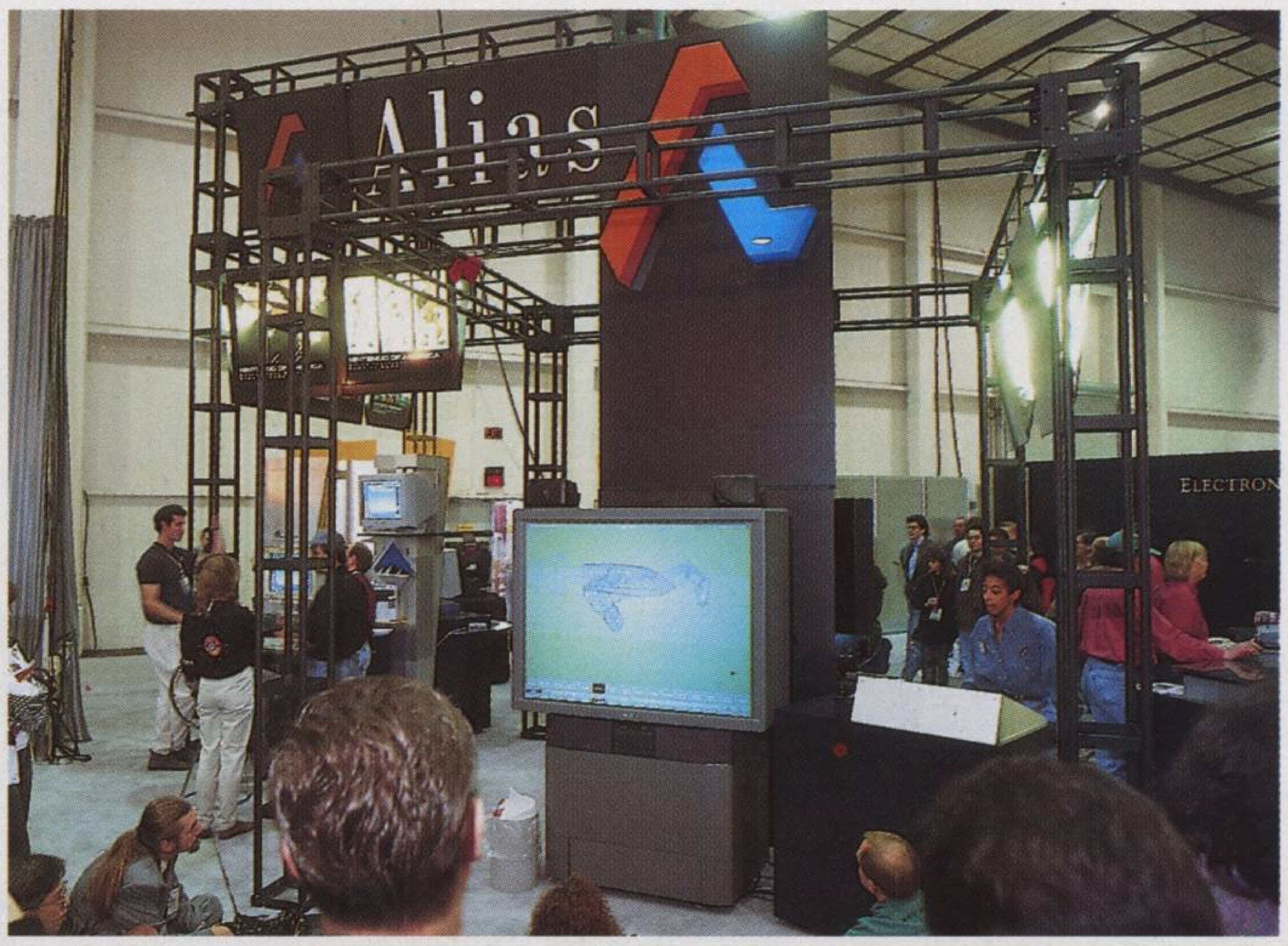
Unlike the Japanese show, at CES Nintendo chose to make the Virtual Boy accessible by appointment only. Expectant delegates queued to enter a room where new software projects were previewed on large screens with the aid of a cardboard viewer held to the eyes. They included a 3D wireframe shoot 'em up, a racing demo, a side-on *Mario* game and a version of *Gunhed*. Encouragingly, the system's 3D graphics abilities were far better demonstrated by this new crop of games, with 2D titles making effective use of depth. The system proper could be played in another room, with only two titles, *Telero Boxing* and *Space Pinball*, made available.

Sega was naturally geared up to pushing its fledgling 32X format. The announcement of a 32X/Mega Drive combo called Neptune proved that Saturn wouldn't be the only other new piece of Sega hardware arriving in 1995, although some of the titles (*Space Harrier*, *After Burner*, *Motocross*, etc) did little to spur interest in the currently unproven format. To try and bolster **Edge**'s enthusiasm, Sega granted a sneak preview of 32X development work undertaken by talented US developers Scavenger, and the results showed that the format does indeed have potential.

Sega was slightly more willing than usual to talk about Saturn. At the rear of its private suite, a Japanese machine played *Virtua Fighter* and the walls were decked with reminders that the rest of Sega's coin-op lineage was also Saturn-bound. Curiously, on the first day of the show the solitary Saturn was seen beside a PlayStation running 3D blaster *Crime Crackers*. However, later it had disappeared. Presumably the rival system was whisked away after someone arrived with a copy of *Toh Shin Den* suggesting it would have made a fairer comparison...

The rivalry between Sega and Sony continued offsite in a different vein. At the Alexis Park Hotel – traditionally Sega's own CES playground – newly →

Virgin's range of software varied from the exceptionally well crafted *Lands Of Lore II* (with arguably the finest *3D Studio* visuals to date) to Looking Glass's *Flight Unlimited* (right and inset) and *Terra Nova: Strike Force Centauri* (both games previewed on page 28)



MultiGen is the latest firm to join the Ultra 64 'Dream Team' (top left), while Alias (above) had the first software capable of rendering hair realistically

New 3DO developer Any Channel debuted their first title, *PO'ed* (?)

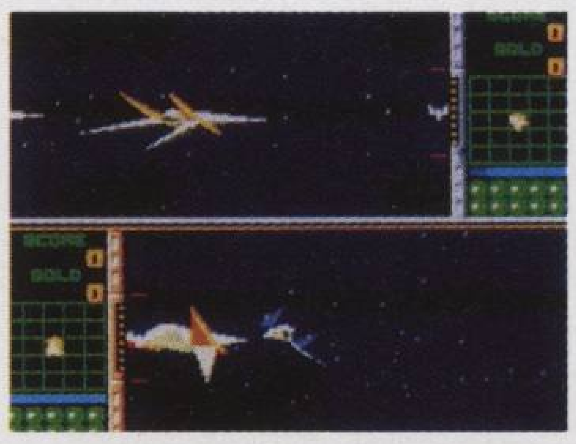
➔ founded Sony Computer Entertainment rented schmoozing suites with the intention of making its new rivals feel welcome. Huge balloons adorned with the slogan 'Sony welcomes Sega to WCES' were suspended above the pool (in which Sonic took an unintended dip) and SOA president Tom Kalinske was delivered a complimentary drink on a serviette bearing the same legend. Such tomfoolery was taken in good spirit by Sega, but Tom K justifiably warned that Sony would have to watch its back at the summer E³ show in LA...

Meanwhile, Sony's audio and video division demonstrated its (and Philips') new DVD high density CD standard to the press at showbiz hotel Bally's. The results were remarkably impressive – approaching LaserDisc quality – and confirmed **Edge**'s doubts about the future of Video CD (**Edge** 17).

Atari, whose presence at CES has grown over the last few years, focused on new software and also previewed its Jag CD drive, which gets a US launch in February. Despite some impressive video footage, the most glaring omission was any decent games for the CD add-on. ATD's *Battlemorph* was apparently too incomplete to be shown, while its other project, *Blue Lightning*, did make it out but failed to set the show floor alight. Once again, it was left to Jeff Minter to save the day. His VIrtual Light Machine, which is incorporated into the Jag CD's hardware, delivers a trippy enough experience for any audio CD-playing, Jaguar-owning hippies.

The cartridge software line-up for the Jaguar was depressingly ordinary. More than anything, Atari's games simply didn't look any different from most 16bit console games.

Behind closed doors, Atari unveiled a prototype model of an all-in-one Jaguar and CD drive. A product of the Edsel school of American design, it looked more like a set of bathroom scales than a console. But then, the Jaguar wasn't exactly blessed with flattering lines...



Starfox 2 **(top) was there, but where was *Battlemorph* (above) for the Jaguar CD?**

i wish...

John Edelson

'I wish the British would drive on the right. It's an easy switchover: we'll start by convincing the large trucks to move over and work on the cars later on.

I wish the US would go metric.

I wish the French would adopt the PAL standard and drop SECAM.

In short, I wish for a standards-based world. Also, that the leisure software industry would get its act together and sign up for proprietary systems. Why would a software company (or a retailer or distributor or customer) lend support to a system in which the vendor is planning to be the sole supplier of hardware and have a majority share of the software market? Don't they know that this means the vendor will have control and soon he will take all the profits for himself?

I wish for yet more games like *FIFA 3DO, Road Rash, Return Fire, Demolition Man, Super Street Fighter Turbo, Samurai Shodown* and *The Need For Speed.*

I wish everyone would work as hard as EA to build a market which is beneficial for the software industry and the customers. Yes, this means accelerated adoption of the 3DO standard for the benefit of almost everyone. Wet mullets all round. Wouldn't Sega make a terrific software vendor?'

John Edelson is The 3DO Company's European director of sales and marketing.

EDGE magazine March 1995

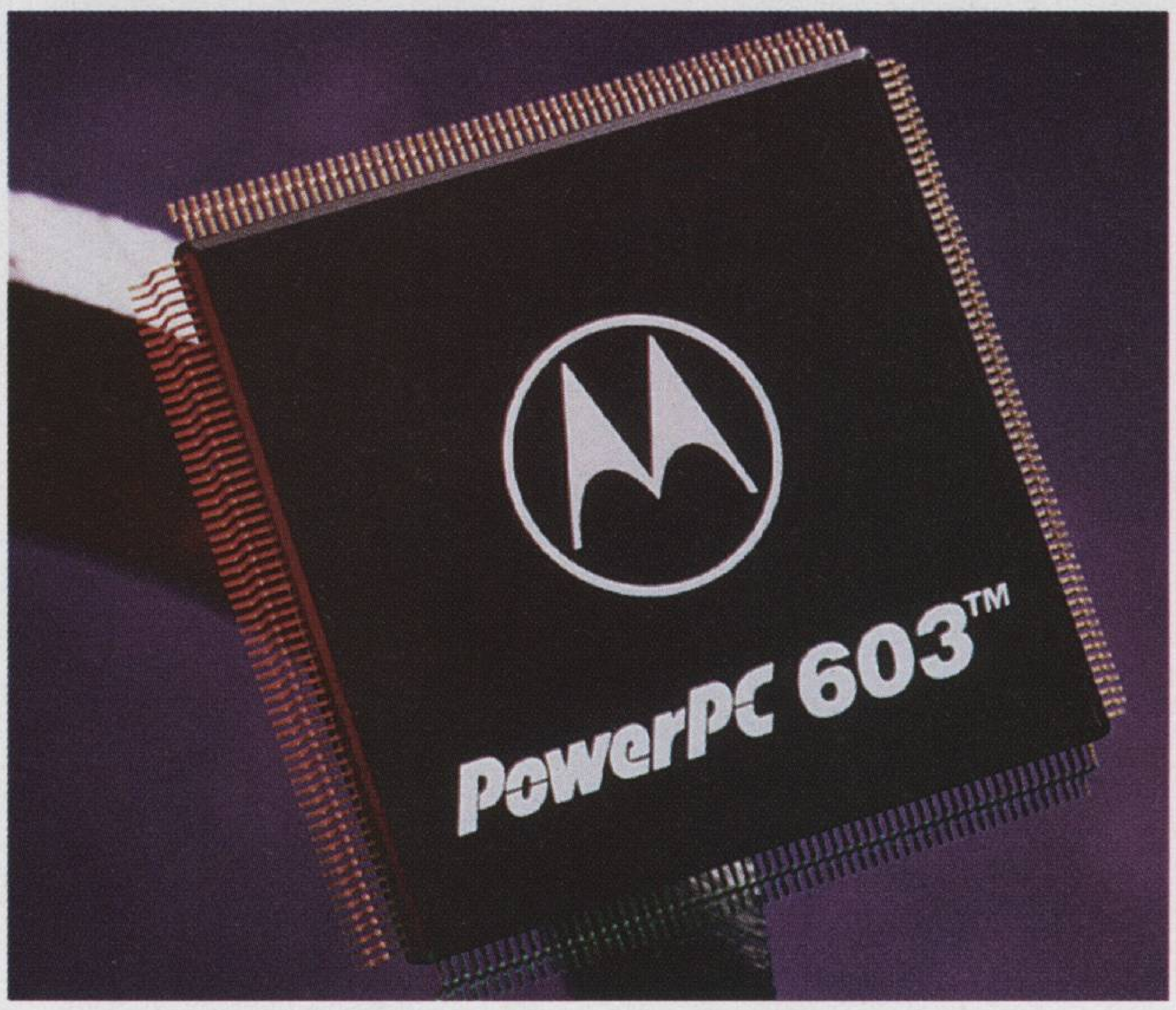
Pippin: Apple reveals son of Macintosh

Apple is entering the home games market with a new Macintosh-based CD console

Apple Computer announced officially in December what most people had known for some time, namely that it is developing a 'multimedia CD-ROM platform', called Pippin, based on *MacOS* (the Macintosh operating system) and the 64bit PowerPC processor. The system, which is scheduled to appear worldwide in late 1995, will be licensed by Apple to 'a variety of vendors from different industries', who will produce their own Pippin players.

The first licensee is Japanese toy giant Bandai, whose own 8bit CD-based console, the BA-X, was released last autumn in Japan. Bandai's Pippin will be badged with the name 'Power Player' and sold for an estimated $500 – an Apple source told **Edge** that a straight pound-for-dollar price of £500 was likely.

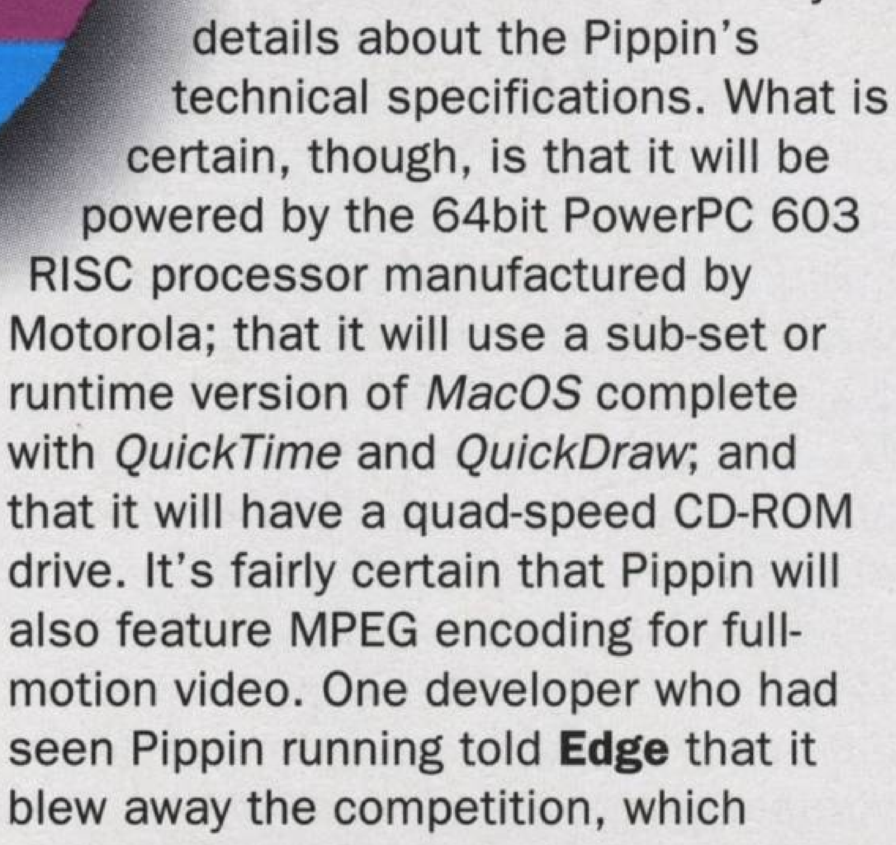
Both Apple and Bandai are reluctant to reveal many details about the Pippin's technical specifications. What is certain, though, is that it will be powered by the 64bit PowerPC 603 RISC processor manufactured by Motorola; that it will use a sub-set or runtime version of *MacOS* complete with *QuickTime* and *QuickDraw*; and that it will have a quad-speed CD-ROM drive. It's fairly certain that Pippin will also feature MPEG encoding for full-motion video. One developer who had seen Pippin running told **Edge** that it blew away the competition, which



Pippin's CPU will be built around the base-model PowerPC chip, the 603, developed by Apple in conjunction with Motorola and IBM

implies that the machine will have its own custom graphics hardware.

However, Apple has also ensured that it is broadly compatible with full-size Macs. Pippin and Power Mac titles should be interchangeable with minimal reworking, and Mac software not coded for the PowerPC will use the services of a 64K emulator built into the console. This means that Pippin users should be able to take advantage of the full range of Macintosh titles.



Pippin's first hardware licensee, Bandai, recently released its own 8bit CD console, the BA-X, in Japan

Pippin is a major departure for Apple – it's the first time the company has licensed its widely respected Macintosh technology to a thirdparty. The deal with Bandai is a clear attempt to gain ground in the home market that has so far eluded the Cupertino-based computer pioneer.

'Bandai's strength in the entertainment industry paired with Apple's legacy in education and leadership in easy-to-use multimedia products will provide customers with an unparalleled home entertainment and education tool,' trumpeted **Satjiv S** →

GLINT gets Creative

3Dlabs' collaboration with the Singapore sound giant Creative Labs is producing tangible results. GLINT chips [see Edge 15] are now available in numbers and boards are being distributed to developers. Creative, manufacturer of the dominant SoundBlaster soundcard for the PC, is scheduling the release of a PC games card for the end of 1995 incorporating both SoundBlaster and GLINT chips, which aims to set a powerful standard for a machine currently dogged by incompatibility problems. The expected price is $250.

Data stream

Number of games sold in one pre-Christmas week: **321,121**
Average cost of each game: **£45**
Proportion of videogame sales accounted for by Sega and Nintendo: **73%**
Sales forecasts for *Donkey Kong Country* at the beginning of January: **225,000**
Ocean's turnover in 1994: **£57 million**
NEC's net sales in 1993: **£22 million**
Number of people employed by NEC: **191,000**
Number of products manufactured by NEC: **15,000**
Number of PCs expected to be shipped in 1995: **50 million**
Projected revenue from PC sales by year-end 1997: **£13.5 billion**
Approximate number of pornographic magazine titles in the USA: **200**
Yearly revenues generated by pornography in the US: **$1 billion**
Number of copies of Playboy and Penthouse bought every working hour in the US: **43,808**
Annual income per head of population generated by pornographic magazines in Sweden: **£3.98**
Annual income per head of population generated by pornographic magazines in the UK: **£8.73**
Value of the telecommunications industry: **$105 billion**
Number of pornographic pictures downloaded from Delft University, The Netherlands, each day: **30,000**
Percentage of postings made by men in the Internet newsgroup alt.feminism: **74%**
Most popular subscription topic on the usenet: **sex**
12th most popular topic on the usenet: **education**

→ **Chahil**, vice president of Apple's New Media Group, the arm of the company that originated Pippin. Apple UK's **Russell Brady** offered a more straightforward statement of intent when he spoke to **Edge**: 'I think that Pippin offers a little bit more than the average games console. I think that for some markets, especially in Asia, the market lies in edutainment not games.'

The burgeoning multimedia market has only really taken off in the last year as CD-ROM drives have been adopted en masse by PC owners. The PC's dominance in the computer market has no doubt prompted Apple to seek another outlet for the Mac's excellent multimedia capabilities. 'Apple has leadership in the multimedia market at the moment,' claimed Brady. 'Over 70% of multimedia products are developed or authored on the Mac. It often happens that some of these don't come out on the Macintosh. It only takes a matter of hours to convert these programs onto the Pippin.'

A £500 price tag would certainly undercut a decent multimedia PC by some £1000, and Apple is expecting over 50 titles to be available at launch. However, with Apple openly admitting that Pippin will be a player rather than a computer – with no applications and no keyboard upgrade – the machine is targeted at the same territory that the Philips CD-i has so obviously failed to conquer. Bandai's influence may change all that, as long as it has the sense to insist on some original games software to entice potential Pippin owners. Unfortunately, Bandai's own Mighty Morphin' Power Rangers are scheduled to star in the first game for the system...

'Bandai's strength in the entertainment industry paired with Apple's leadership in easy-to-use multimedia products will provide customers with an unparalleled entertainment and educational tool'

Satjiv S Chahil, Apple New Media Group

What is it?

Launched in the early '80s, this product represented Nolan Bushnell's return to the home electronic entertainment market. Aiming it at a young audience, Bushnell expected it to take the toy world by storm

HDCD: CD enters second phase

Sony and Philips have joined forces to develop a new high-capacity CD

Sony and Philips, two of the inventors of the compact disc which originally appeared in 1981, have proposed an upgrading of the standard to enable a 12cm disc to store 3.7Gb of information on each side. This kind of capacity will, it is hoped, be adequate to cope with the amount of data needed by the multimedia applications of the future.

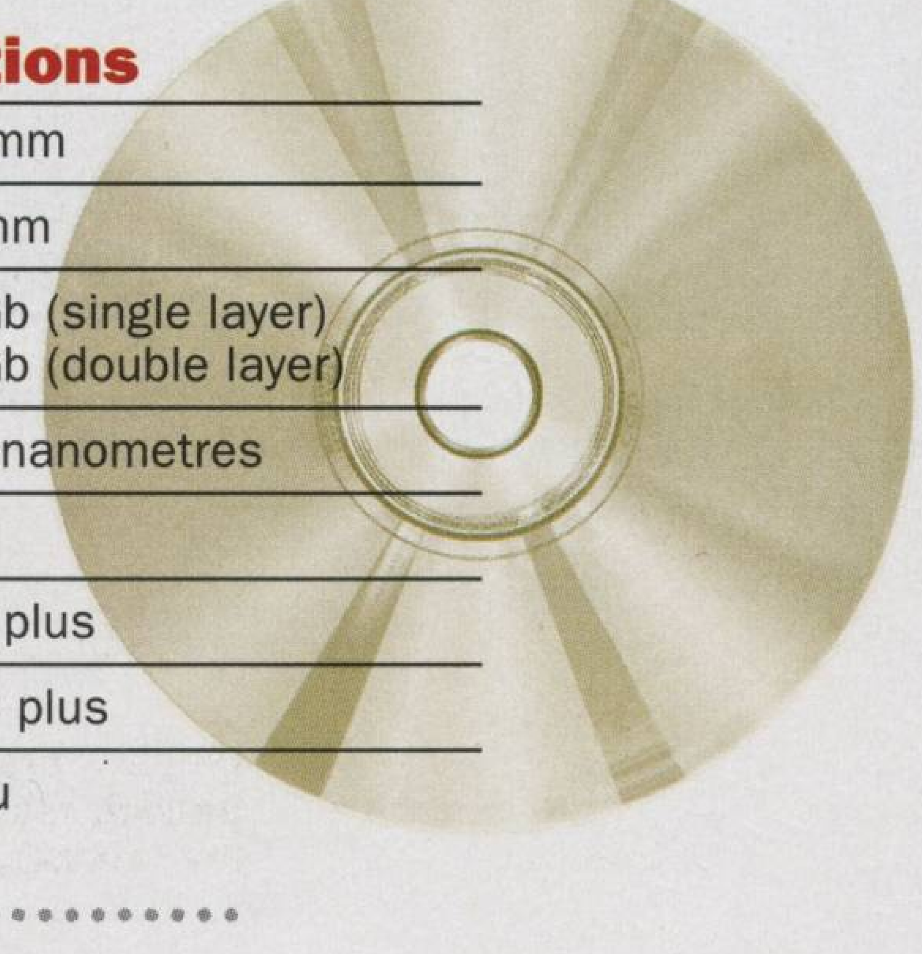
The HDCD (high-definition CD) technology is based on a short wavelength (635 nanometres) red laser, improved modulation and more sophisticated error correction. These enhancements allow the laser beam to be focused more precisely on the surface of the CD, which means that the pits – and the spacing between them – can be reduced in size. American disc manufacturer 3M is also working with Philips and Sony to develop the double-sided discs.

The new discs will be able to store 135 minutes of MPEG2 footage, as well as compressed digital audio and subtitling. The playback quality will be higher than that of conventional magnetic tape and should be closer to the picture provided by LaserDiscs.

Sony and Philips say that existing facilities could manufacture discs to the new standard with only minor modifications to their equipment. This means that they should cost roughly the same to manufacture as conventional discs. The group will finalise specifications by the middle of this year.

Proposed specifications

Disc diameter:	120mm
Disc thickness:	1.2mm
Disc capacity:	3.7Gb (single layer) 7.4Gb (double layer)
Wavelength:	635 nanometres
Numerical aperture:	0.52
Modulation:	EFM plus
Error correction:	CIRC plus
Track pitch	084μ



Low-cost 3D power from **VideoLogic**

***RenderWare*, *BRender* and *Reality Lab* have a new competitor**

it is...

The Petster. Designed as a robotic pet, this sonically-responsive gadget ran on wheels and responded to hand claps and other commands. Not unlike some of Bushnell's other endeavours, it flopped

Britain is rapidly becoming a centre of excellence for 3D rendering systems aimed at the videogames industry. The latest addition to the field is VideoLogic's innovative PowerVR technology.

PowerVR is designed to provide fast rendering with a wide variety of 3D effects such as Gouraud shading, true-colour modes, rotation and scaling. Although these abilities are shared by other prominent 3D systems like *RenderWare*, *BRender* and *Reality Lab*, PowerVR takes a markedly different approach by using dedicated custom hardware and a new object-orientated API (application programming interface) to boost rendering speed and texture-mapping abilities. VideoLogic claims that the system provides arcade performance for the price of a console.

At the heart of PowerVR is the Image Synthesis Processor (ISP), which creates the required scene in memory before displaying the results. PowerVR's other custom chip, the Texture Shading Processor (TSP), supplements the ISP by providing all the hardware texture mapping plus various special effects.

Like many advanced programming languages, such as *C++*, PowerVR's API is object-orientated. Once each object is defined, there's no need to redefine it for every situation in which it appears. Hierarchical linking of objects is also an important aspect of the PowerVR API. This allows quicker and more precise code to be written, thereby reducing development times for games.

According to VideoLogic, PowerVR will allow the creation of games with unlimited colours

'It's a generation ahead of all the technology used in the latest Japanese consoles,' claims **Neil Davison**, VideoLogic's European marketing manager. 'Most other approaches to fast 3D still involve the construction of wireframe models, which are then filled and texture mapped and hidden surfaces removed. PowerVR, however, does not use this method.'

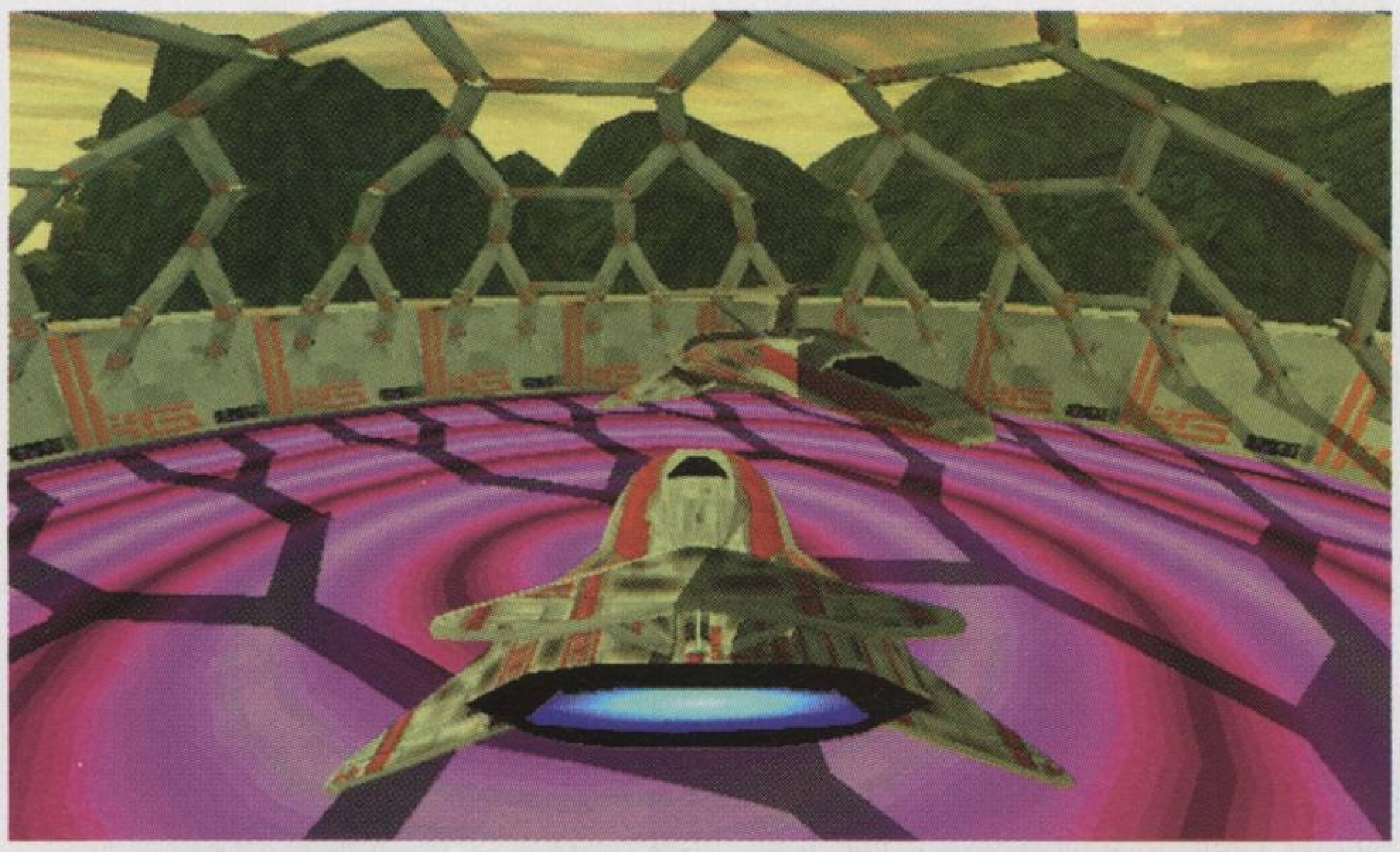
Complex textures (above) and effects can be added to every object in PowerVR by means of the custom Texture Shading Processor (TSP)

Instead it employs a new technique which VideoLogic refuses to elaborate on as a patent is currently being applied for. At its heart is a procedure for dealing with the 3D clipping of polygon faces (z-buffering).

VideoLogic claims that *PowerVR* provides arcade performance for the price of a console

'We wanted to eliminate as much memory [occupied by PowerVR] as possible,' explains Davison. 'Z-buffering is memory heavy and processor intensive. Our entirely new approach means that no z-buffering is required at all. This is the key to the huge cost reduction that we've pulled off here.'

There are other advantages to this approach. Because each object is defined and no processor time is required for z-buffering, more power can be directed toward the special effects. Transparent operations are particularly →



Shadows are automatically calculated by the API (top). Fast clipping of objects like these cliffs is PowerVR's forte (above)

PowerVR gets NEC deal

VideoLogic has established a joint venture with NEC aimed at turning PowerVR into a massmarket product within a year. The technology has been licensed to the Japanese company, which is responsible for manufacturing and marketing the system. The deal could be lucrative for both parties. NEC's links with major Japanese firms place it in an enviable position to obtain high-paying customers in the console market. There are already rumours that Sega is involved in negotiations.

➔ enhanced, making it much easier to produce images like car windows and buildings visible through flames.

Also, as there is no distinction between moving objects and background scenery, more colours can be manipulated simultaneously and realistic shadows are automatically added for every polygon with no reduction in speed. Says Davison: 'Obviously we still have to render each frame but the process is greatly speeded up this way.'

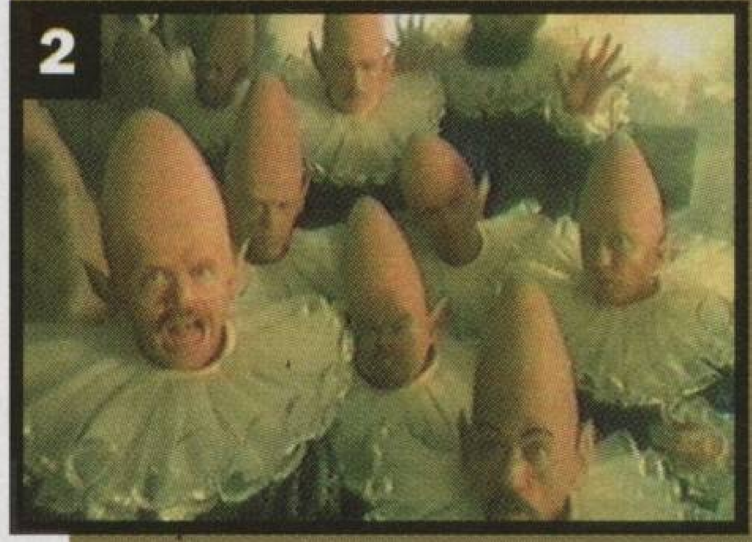
And PowerVR is scalable – if you double the number of chips, you increase processing power twofold. Ultimately, the aim is to implement PowerVR with only one chip, thereby making it even cheaper to incorporate in consoles and add-on boards. A full system would include a processor, memory, a storage medium and the PowerVR chips. VideoLogic claims that this will cost no more than £300.

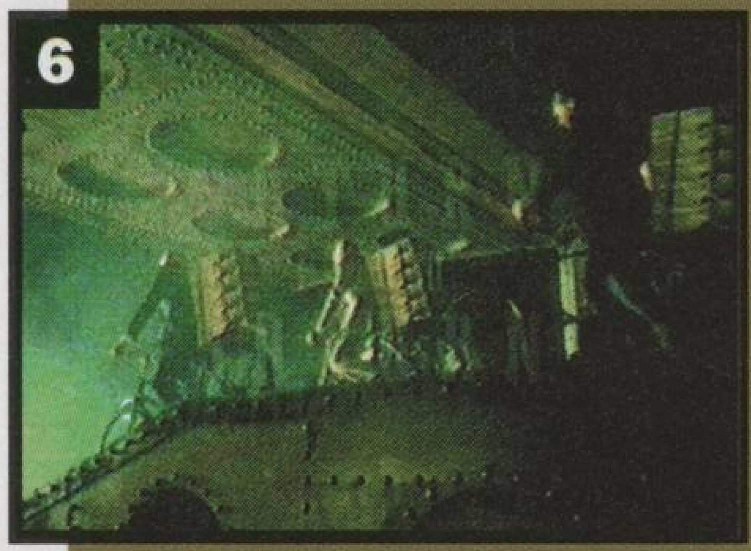
The promise of arcade-perfect conversions of games for home machines is too enticing a prospect for major companies to ignore. By offering custom hardware and software to tackle the task, VideoLogic could be in a strong position when PowerVR-based systems arrive next year. ∈

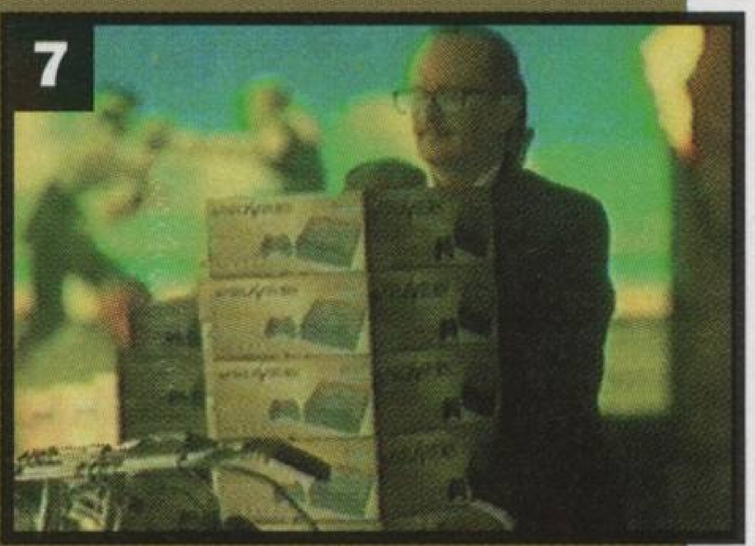
Advertainment

In its occasional series on the art of videogames marketing, Edge views Sega's Japanese TV commercial for the Saturn

Company:	**Sega**
Product:	**Saturn**
Date:	**Dec 1994**
Origin:	**Japan**







1 The action begins in a factory on the planet Saturn. 2 A group of coneheads are enthusiastically discussing the production of Sega's new console. 3 A printing press stamps the Saturn logo onto the machines. 4 The coneheads retire to a cloakroom. 5 They disguise their cranial bulbousness with masks. 6 They then enter their spaceships. 7 A conehead disguised as a stereotypical British businessman delivers a pile of Saturns by bicycle. 8 But it was all a dream. Back in reality, the businessman goes home with his Saturn. 9 The logo reads: 'Saturn from Saturn'

Saturn and Playstation: battle commences

With Sega and Sony now entering the next-gen games arena, Edge weighs up the pros and cons of their machines

Welcome to the next level. Sega and Sony join 3DO and Jaguar in the race for domination of the 32bit games market. Both have the power to make it big, but which one will win the hearts, minds and wallets of the gaming public?

The next generation is now well and truly under way: Sega's Saturn and Sony's PlayStation have arrived. **Edge** takes the opportunity to compare and contrast the relative strengths and weaknesses of both machines.

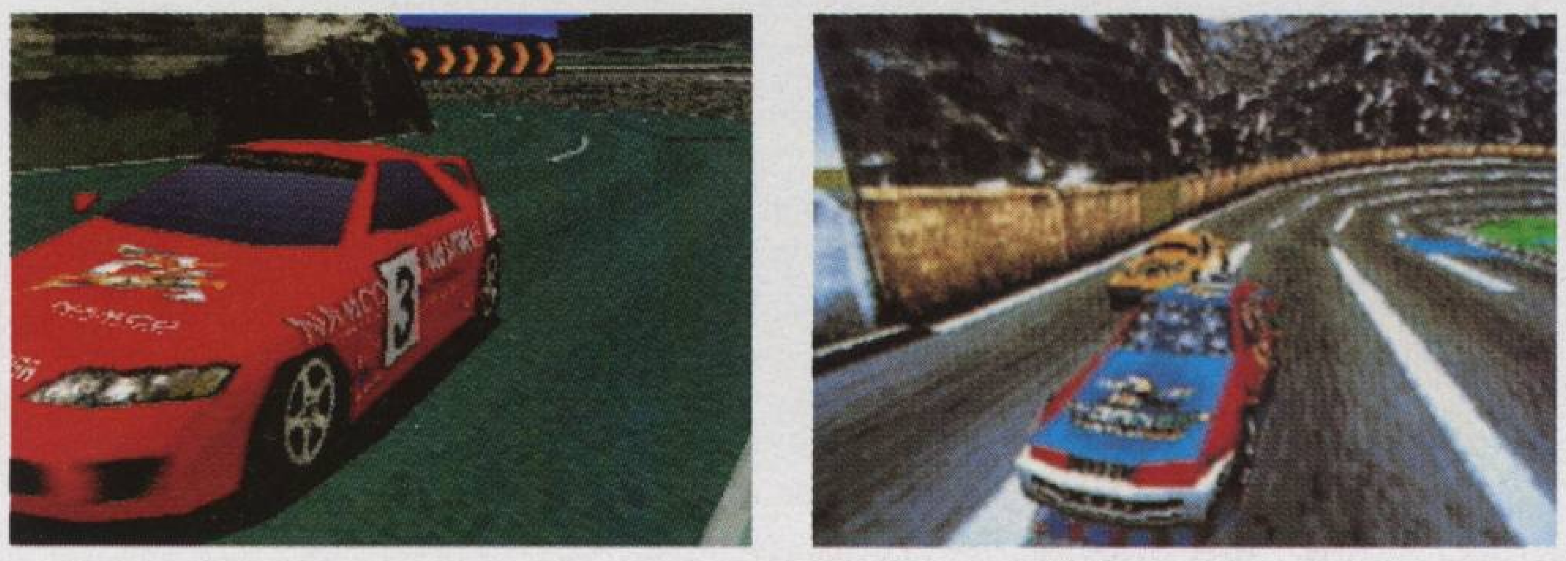
As far as hardware aesthetics go, popular opinion is split: the chunky grey Saturn (the glorious silver casing of the pre-pro model was, sadly, canned) has pleasing lines and a weighty feeling of power, but is something of a juggernaut compared to the slimline PlayStation. Sony's baby takes up exactly 70% of the volume of the Saturn, and has a substantially smaller footprint.

The Saturn's design is elegant, if stocky, while Sony has chosen to go for graceful simplicity in its design, with only rows of serrated vents cluttering the sides of its machine.

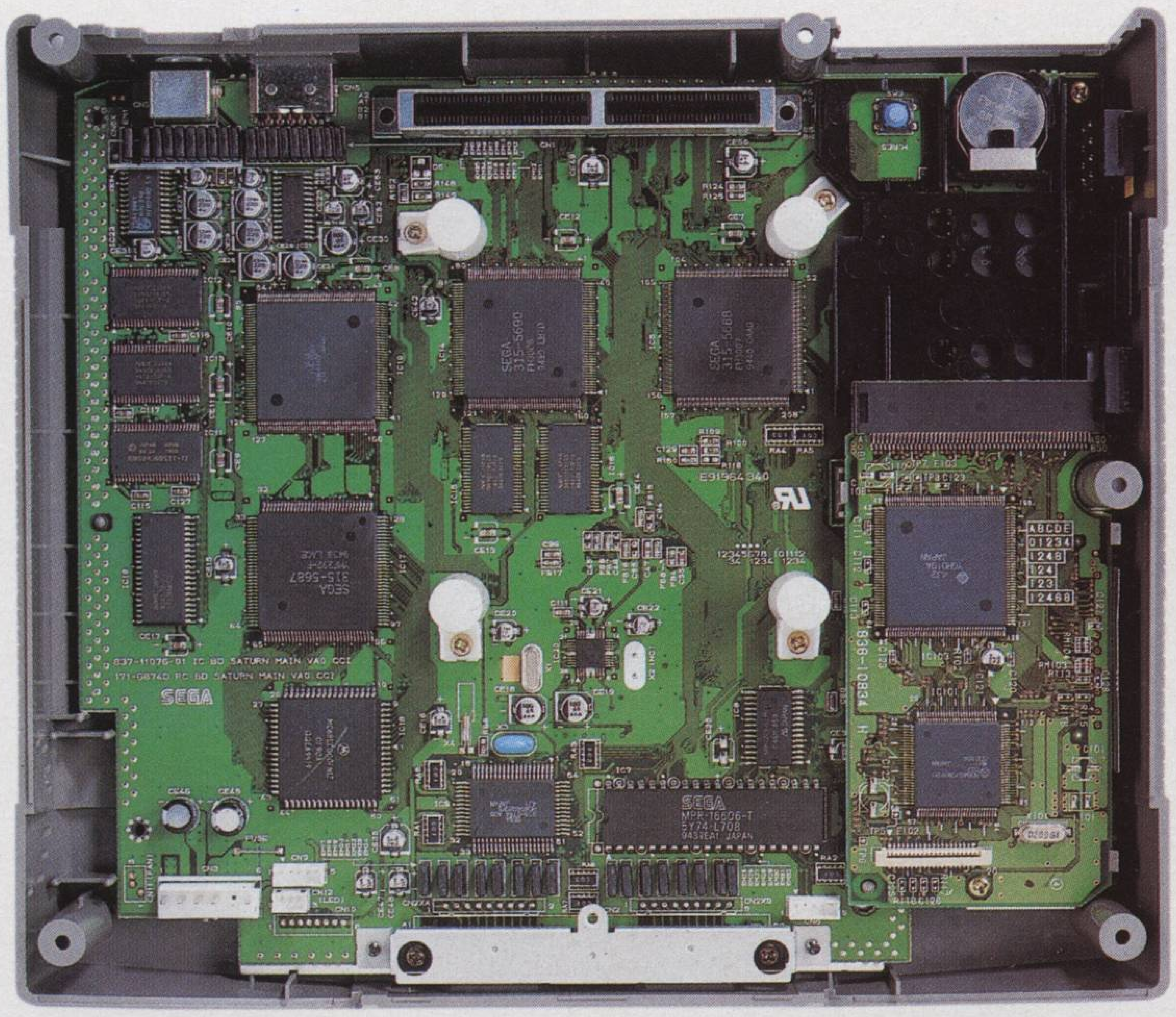
Both casings are moulded from ABS (Acrylonitrile Butadiene Styrene) plastic, which is suitably robust. Sony's build quality isn't usually in question; however, this does mark something of a turning point for Sega after the flimsy and suspiciously lightweight Mega Drive and Mega CD (although the Saturn still feels disturbingly hollow). Joypads are a similar story. Sony's device – contrary to popular belief – is the superior of the two in all regards: build quality, ergonomics (surprisingly) and general 'feel'. But, all credit to Sega, its cord is almost twice as long as Sony's.

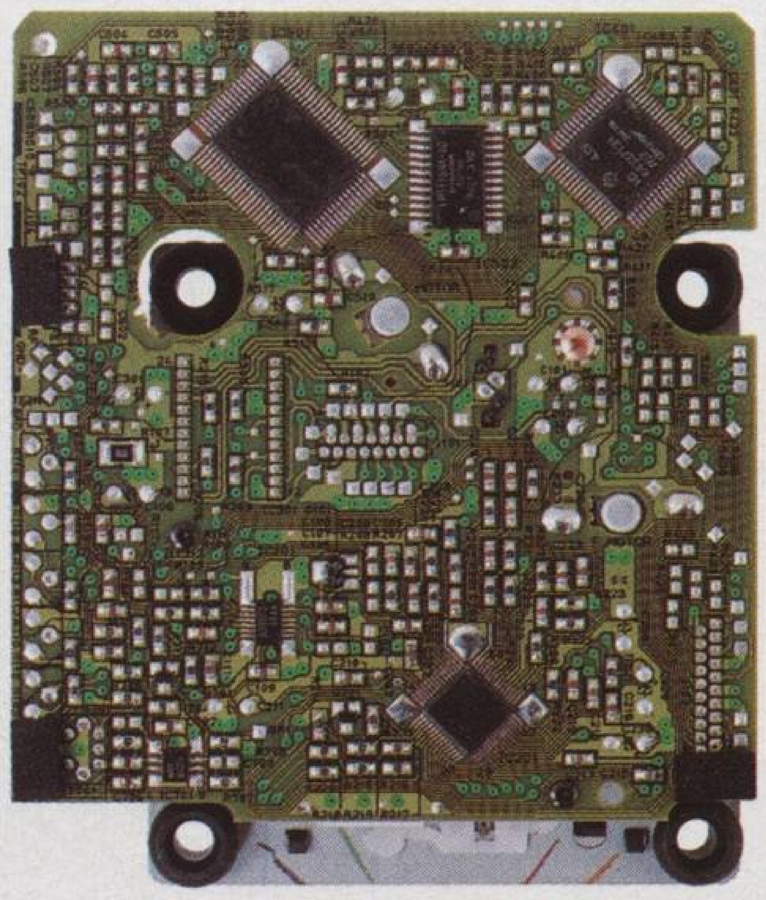
The chunky grey Saturn has pleasing lines and a weighty feeling of power, but is something of a juggernaut compared to the slimline PlayStation

The rear ends of both machines reveal a similar picture: while the Saturn has just two Sega-standard ports – one enigmatically labelled 'Communication Connector' – plus a ten-pin A/V socket, the PlayStation boasts the following ports: a dedicated I/O socket, R and L audio phono jacks, a composite video phono jack, an S-VHS DIN socket and a Sony-specific A/V port. Certainly, as far as



Namco's *Ridge Racer* (left) was the first to show its credentials; *Daytona* on the Saturn (right) already has something to live up to





The Saturn's interior (left) suffers from Sega's off-the-shelf chip policy. Three separate circuit boards and dozens of chips are needed to make it all work. The sound is generated by a group of chips which lie underneath the CD drive mechanism (above)

Where is it?

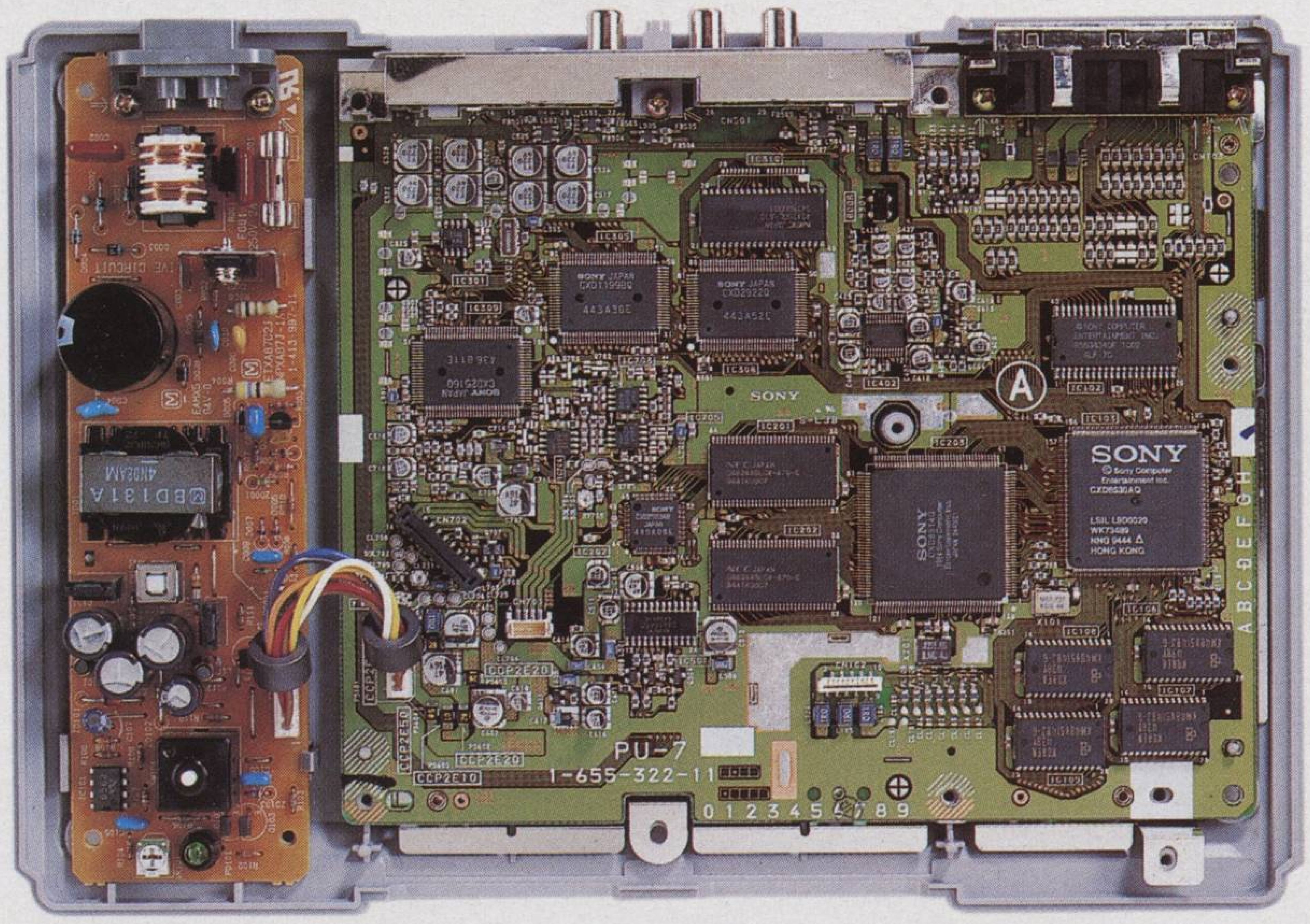
It was the test site for the world's first commercial arcade machine, *Pong*. The coin-op was Nolan Bushnell's second attempt, after *Computer Space*, at producing a dedicated videogame machine

Statistics

DIMENSIONS
PlayStation: height 58mm x depth 184mm x width 266mm = 2838cm³.
Saturn: height 85mm x depth 259mm x width 227mm = 4007cm³.

PRICES
PlayStation: Japan RRP ¥39,800 (£249); Import £645 (average, including *Ridge Racer*).
Saturn: Japan RRP ¥44,800 (£280); Import £580 (average including *Virtua Fighter*).

After the initial silly season, when machines were fetching around a grand on import, prices have now settled down. The Saturn had a brisk start but interest has now generally waned in favour of the PlayStation.



The PlayStation's unbelievably neat circuit board belies the machine's power. Sony's integrated silicon has enabled it to produce a very space-efficient design

connectibility goes, the PlayStation is the friendlier machine.

Both systems carry the promise of expandability with removable covers hiding expansion ports (but then, so did a dozen consoles before them). This same port on the Saturn also gives access to the battery holder: a battery is included with the machine, giving it built-in system memory, with a clock and calendar. However, Sony has opted for the slightly more elegant battery-backed memory cards which fit into the case above the joypad ports. Round two to Sony.

The hitherto undiscovered interiors of the machines reveal a telling scene. Sony's hardware is a masterpiece of design, with one board carrying the heavy components, one large circuit board, and the CD drive sitting on top of a thin metal shield.

The Saturn, however, is a mess: again the bulky components take up one circuit board, but there's another trio of boards carrying the CD drive and processors in a clumsy three-tier configuration. All manner of wires and ribbon cables are needed to complete the circuit.

LaserActive no go

Because of the high price of the hardware, Pioneer has canned plans to bring its LaserDisc-based LaserActive system into the UK.

LaserActive employs separate plug-in packs which enable users to play Mega Drive and PC Engine cartridges, as well as dedicated Mega-LD and LD-ROM² games.

The CLD-A100 (plus Mega-LD games pack) currently sells for ¥91,000 (£569) in Japan, and nearer $1200 in the US.

At this high price, and with competition from dedicated 32bit games machines, the system would no doubt have bombed horribly.

Continued next page

But, of course, the real proof of the console is in the playing. And while Saturn has proven its worth with *Virtua Fighter* and *Clockwork Knight*, the PlayStation has stolen the limelight with *Ridge Racer*, *Motor Toon GP* and *Toh Shin Den*. And the signs are that it will continue to steal the limelight. Unless Sega's technology has hidden depths, it looks like it has been outclassed and overpowered by the Sony hardware.

Sony has just announced the formation of Sony Computer Entertainment (Europe), a new division of Sony Electronic Publishing which is dedicated to managing the PlayStation business in the UK and Europe. This completes Sony's organisational structure ready for the launch of the PlayStation later this year.

Chris Deering, who was previously the executive vice president of Columbia TriStar Home Video International, has been appointed president of the new division. The Sony hierarchy is such that Deering now reports to Jonathan Ellis and Ian Hetherington, joint MDs of SEP (Europe), who in turn report directly to Olaf Olafsson, president of the US Sony Electronic Publishing Company.

Sony's commitment to the PlayStation and a successful 1995 launch extended to a technical workshop which took place at London's Royal Lancaster Hotel in January. The programme of events covered both the commercial and technical potential of the PlayStation and was attended by delegates from SCE Japan, most notably its deputy president, Terihusa Tokunaka, and Ken Kutaragi, designer and inventor of the PlayStation.

NDAs notwithstanding, **Edge** will have a full report next issue.

Meanwhile, at the Las Vegas CES, Sega named *Softimage 3D* as the official 3D development tool for the Saturn. Formerly known as *Creative Environment*, Microsoft's 3D rendering and animation package now incorporates the Softimage name due to its recognition throughout the development community.

Microsoft will be enhancing the *Softimage 3D* software and releasing it as a toolkit for Saturn development. In return, Sega will purchase a 'substantial number of licences' for the toolkit and include it in its official Saturn development package for independent thirdparty developers.

The toolkit incorporates a 2D paint retoucher, enabling artists to alter texture mapping in 2D and see the results realtime in 3D; plus an advanced interactive colour reduction tool, allowing users to switch between 24bit space and the requisite number of bit-planes; and a Saturn file-format online viewer, which provides previews of *Softimage*-generated files at Saturn resolution. *Softimage 3D* also boasts leading motion-capture technology, as used to generate the lifelike animation in *Virtua Fighter*.

Yu Suzuki, director of Sega's amusement software R&D headquarters, is quoted as saying that 'We selected *Softimage 3D* after evaluating the other major 3D products on the market. Sega has used *Softimage* tools for all of our amusement games for a number of years. *Softimage 3D* offers a shorter learning curve and higher productivity while delivering top-quality results.'

Softimage 3D costs from $8000 for the basic package to $20,000 for *Softimage 3D Extreme*, including *Eddie*, a special effects, compositing and paint package.

***Virtua Fighter* (left) is still, as yet, the only reason to buy a Saturn. The PlayStation's *Toh Shin Den* (right) puts up a decent challenge with some gorgeous graphics. But, as always, it's down to playability and Virtua *Fighter* wins out**

it is...

Andy Capp's tavern, a pool bar in Sunnyvale, California. In autumn 1972, Bushnell secured a spot next to a pinball machine to debut his brainchild. The game broke down on its second day, after taking too many quarters

Enhanced Star Wars '97

Following stories, rumours and official denials, George Lucas has at last admitted that a special edition of Star Wars is to be released in 1997.

Using Industrial Light And Magic's advanced CGI technology (Jurassic Park, The Mask) Lucas hopes to improve many of the effects with which he has been unhappy since the film's debut, and populate many scenes with extra creatures and droids.

The re-release will also feature an additional four-minute scene where Han Solo meets Jabba The Hutt, which was omitted from the original.

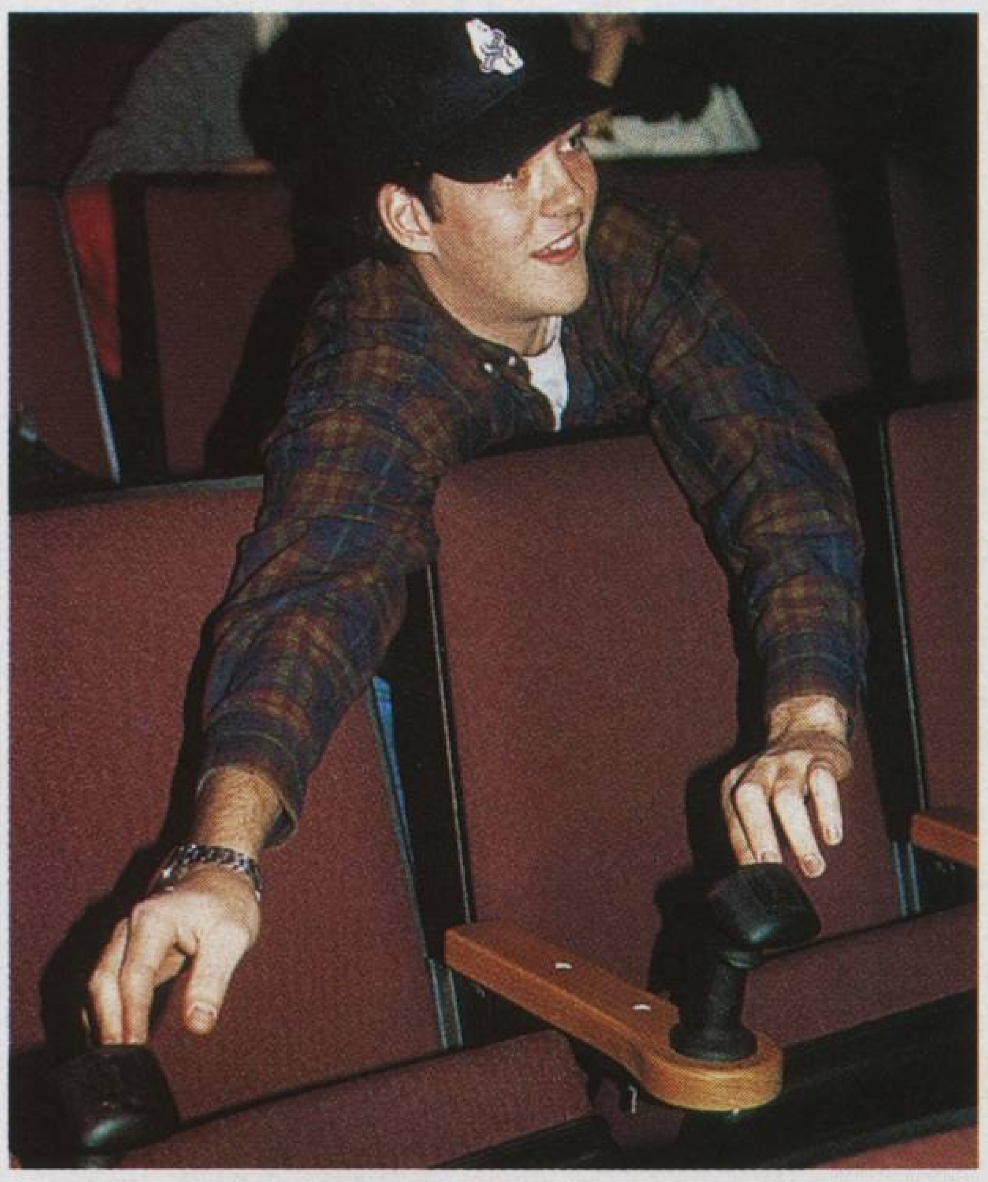
With episodes one, two and three of the nine-part series going into production over the next few years, no doubt the entire planet will be feeling The Force (of officially licensed products) before long.

The real **interactive** movie

It's not CD-based, it's not Pentium-compatible, but it really does have a multiple-player option...

The phrase 'interactive movie' has, in the past, been applied to products that were only vaguely movie-like and not terribly interactive. However, a *real* interactive movie is to be released across America on February 17. Devised by Interfilm Inc and produced by Sony New Technologies, this movie has its origins in Hollywood rather than a software house.

The film, called Mr Payback, lets the audience decide the plot using a voting system attached to the cinema seat armrests. Onscreen prompts appear at vital junctures in the plot, at which point the audience hits one of the buttons to select what happens next. Over two hours of footage was shot, of which 20 minutes' worth is viewed during each sitting.



Audiences took to the joystick-based system with enthusiasm (top). Whenever a plot-altering decision occurs, the arm-rest buttons light up (middle). Star of Mr Payback, Baywatch's Billy Warlock (bottom)

Bob Gale, writer and producer of Back To The Future has penned and helmed Mr Payback, and Sony has ensured that some well-known faces star in the film. Christopher Lloyd, who played Doc in Back To The Future, and Billy Warlock from Baywatch head the cast, with other big names making cameo appearances.

The system operates by holding all possible clips on LaserDiscs. Each chapter is accessed according to the wishes of the majority of the audience and displayed onscreen using the Interfilm exhibition system. The modifications that each auditorium is required to make are minimal.

The videogame market still isn't taken seriously despite being worth considerably more than the film industry. This interactive movie is unlikely to change that but it may enlighten some of the less bigoted individuals who try it.

Essential reading

Hackers

- **Steven Levy**
- Penguin, £6.99
- ISBN 0-14-023269-9

Unlike the mischief-makers to whom the term 'hacker' is usually applied today, the subjects of Steven Levy's book are cast in a heroic mould. This is the story of the pioneers of the digital age, whose achievements set in motion a profound scientific and social revolution.

They make unlikely heroes. The bespectacled technology junkies comprising the brotherhood of digital acolytes which grew up at MIT in the 1950s were an unprepossessing bunch. But they were also a remarkable collection of geniuses and visionaries. In the 1950s, the only computers were room-sized 'hulking giants' to which only a privileged elite has access. The hackers manoeuvred their way into the presence of these beasts and embarked on a punishing frenzy of experimentation and discovery. Their efforts may seem insignificant today – thousands of man-hours were spent perfecting a program that would calculate in decimal, for example – but this nerdy group of hobbyists was at the cutting edge of computer science.

Although Levy's misty-eyed eulogising of what he calls the 'hacker ethic' overstates the case somewhat, the hackers were characterised by a shared set of vaguely utopian beliefs. Chief among these was the notion that all information should be freely exchanged. The hackers at MIT fed off each other, constantly refining and improving each other's programs. Later, when the microprocessor led to the advent of home-made computers, self-help groups sprang up to pool software and technical discoveries. But by the 1970s this laudable co-operative spirit was becoming unsustainable. Bill Gates' furious reaction to the widespread 'piracy' of his Altair BASIC was an indication that the times were changing. The techno-nerds were losing ground to the profit imperative. The computer industry was about to go ballistic.

There's a certain purity to the activities of the early hackers. They were driven only by a thirst for knowledge and a quest for perfection. The equipment they used was almost unbelievably primitive by today's standards, but they conquered each obstacle with a determination bordering on the obsessive. Next time you boot up your state-of-the art PC, spare a thought for the users of the first mass-produced computer, the Altair 8800, which had no keyboard (data had to be laboriously entered, bit by bit, via a series of switches) and had to make do with a scarcely credible 0.25K of RAM, and marvel at how far we have come.

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This month on EDGE

Welcome to the **Edge** experience – a rollercoaster ride through one month in the life of the world's best games journal

Shock story of this issue is the news that Time Warner has bought out software house Accolade, and immediately decided to axe the UK division. Staff from Accolade UK were on board a plane en route to the CES when the news broke. First day on the stand, they were given their redundancy papers and plane tickets back to the UK.

And a happy new year to Time Warner, too.

The CES show at Las Vegas was not the only venue of interest to a select few UK journalists who crossed the pond. **Edge** raises its, erm, hat to those few who braved the rigours of the Chicken Ranch – a sort of expensive nightclub an hour's drive from Vegas. Ahem.

Edge's favourite packaging blurb: Takara's *Toh Shin Den*. The cover artwork features nothing but a Japanese logo and the following message in English text: "Waw!? And now, what's going on!? *Toh Shin Den* is about to present to you a super hot virtual battle, like one that you've never seen before at a rate of 90,000 polygons per second!"

Among the dozens of yards of faxes **Edge** received this month was one from Johnny Magrippi in Athens, who claims that the Sega Saturn is actually a 64bit machine. Accompanying the letter was a duplicate of a Sega advert emblazoned with the offending claim. And, sure enough, after checking the latest Sega ads in some Japanese magazines, **Edge** found that the Saturn is in fact being branded as a 64bit system. Not 32bit as **Edge** had so foolishly been led to believe.

Either at the last moment Sega shoved a Special Hitachi Chip® in the machine or it is guilty of using the same creative maths as Atari. (By our reckoning, Sony's PlayStation comes out at around 80bits, including the sound chip.)

Certain members of the **Edge** team have been getting grief from the step-down transformer pictured in issue 17. For some reason, the device keeps blowing fuses.

If you've been the victim of a similar problem, you may like to know that Datel has recently released dedicated transformers for the PlayStation and Saturn. They cost £20 each and can be ordered direct from Datel on 0782 744707. And unlike the grey monster **Edge** bought, these are a similar size to the normal 9v transformers available.

The saddest news of the issue is that, after sterling service over the last 18 months, Rob Abbott, **Edge**'s art editor, is off to launch (yet another) games magazine. So long, farewell, auf wiedersehen, adieu...

Edge's top five tunes to get airtime during issue 18:

1. 'Substance' (New Order).
2. 'The Police Greatest Hits' (The Police).
3. 'Zingalamaduni' (Arrested Development).
4. 'Vitalogy' (Pearl Jam).
5. 'Pulp Fiction' (Various).

Datebook

February

tek: The Dive Technologies Conference and Exhibition February 1–3, San Francisco, California. Tel: **010 1 800 365 2655**. Fax: **305 293 0729**

Imagina February 1–3, Monte Carlo. Tel: **010 33 49 83 26 93.** Fax: **010 49 83 31 85**

Electronic Imaging February 5–10, San Jose, California. Contact IS&T/SPIE on **010 1 206 676 3290**

Taiwan Amusement Exhibition February 8–12, CETRA Exhibition Hall, Taipei, Taiwan. Contact Creative International PR on **010 886 2321 5098**

Blackpool Amusements Exhibition February 21–23, Winter Gardens, Blackpool. Contact Janet Fairgrieve on: **0253 25252**

Virtual Reality World '95 February 21-23, Stuttgart, Germany. Tel: **010 43 51229 5760**

TED6 Conference February 22–25, Monterey, California. Tel: **010 1 401 848 2299**. Fax: **010 1 401 848 2599**

March

PC Forum March 5–8, Phoenix, Arizona. Contact Daphne Kis on: **010 1 212 924 8800**. Fax: **010 1 212 924 0240**

CeBIT '95 March 8–15, Hanover, Germany. Tel: **010 1 609 987 1202**. Fax: **010 1 609 987 0092**

World Of Entertainment March 10–12, Prague, Czech Republic. Tel: **010 422 2491 1681**

International Gaming Business Exposition March 20–22, Las Vegas, Nevada. Tel: **010 1 203 852 0500**

Spring Electronic Consumer Trade Show March 26–28, Olympia, London. Tel: **081-742 2828**

May

Electronic Entertainment Expo (E³) May 11–13, Los Angeles Convention Center, Los Angeles, California. Tel: **010 1 914 328 9157**

Show organisers: if your show isn't listed here, it's only because you haven't told **Edge** about it. Do so on 01225 442244, or fax us on 01225 338236, or send details to **Datebook, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW**

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Letters

Express yourself in **Edge**. Write to: **Edge** letters, 30 Monmouth Street, Bath, Avon BA1 2BW

I'd like to have one last poke at the dying embers of the Acorn coverage debate. **Edge** exists to showcase and criticise the latest in gaming experience regardless of location, format or price. Obviously, certain formats have more relevance to readers than others and consequently get more coverage. However, if you are going to cover SNK and NEC consoles, you should also look at interesting products closer to home. Reviews of the Acorn versions of *Flashback* or *Sensible Soccer* would obviously serve no purpose; however, there is a growing number of good games that are unique to the format and deserve wider examination.

Acorn is already providing games on demand through the On-line Media trial in Cambridge. This technology is aimed at the 'black box' consumer electronics market, so Acorn must be confident of the quality of its games into the future.

Paul Biggs,
Derby

The case remains that the Acorn market is neither huge nor responsible for any major leaps in game development. It generally only receives conversions of PC or console software. And the fact that Acorn is pumping games on demand is in no way a reflection of the quality of its games – poor software goes down fibreoptics just as well as great software.

However, **Edge** will continue to watch the Acorn scene, and if anything revolutionary crops up it will be covered.

Paul Biggs demands to know why Edge covers exotic systems like NEC's PC-FX but doesn't give Acorn's homegrown machines a look-in

When you review Saturn *Virtua Fighter*, could we have an in-depth view of the gameplay mechanics and the control method? I say this because I have this feeling that you're going to spend the whole 2-3 pages talking about polygons. It's not as though I'm not interested in polygons and SH-2 chips, but there is plenty of space in the average **Edge** review for a bit of attention to detail. I guess you must have your reasons for keeping your reviews short and a bit on the shallow side, but I can't see it.

All of my friends are fascinated with **Edge** – even computer haters. I guess it must be something to do with the techno-art covers – please do some more. I believe **Edge** can be read by almost anyone and enjoyed. I like a magazine that expands the mind, although to fully enjoy **Edge** we need a jargon supplement – just what are SRAM and VRAM?

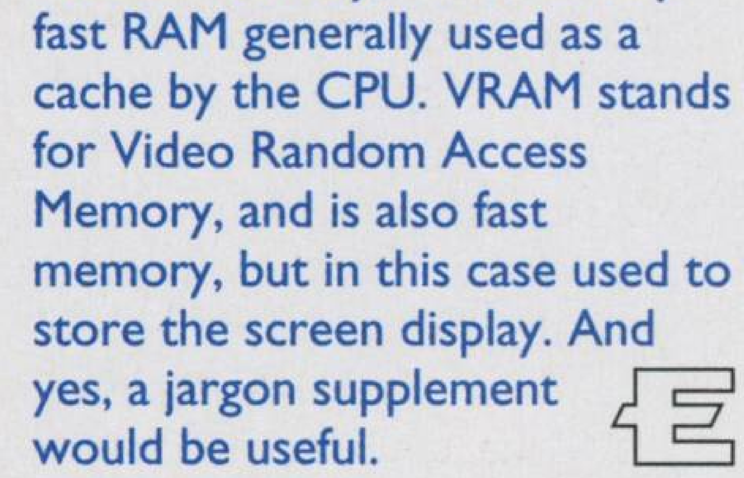
Colm Grow,
Farnborough

Hopefully, the review of *Virtua Fighter* in the last issue put your mind at rest. It did go into some detail on the control system, but to fully do justice to all the moves of all the characters would take up a considerable amount of space.

Edge's reviews can hardly be described as shallow. The magazine's mission is to provide a judgement on the current state of the art, not act as an instruction manual.

SRAM is Static Random Access Memory, which is very fast RAM generally used as a cache by the CPU. VRAM stands for Video Random Access Memory, and is also fast memory, but in this case used to store the screen display. And yes, a jargon supplement would be useful.

When the Sega Mega CD was released in the UK, Sega claimed that the reason for its high price tag was the strong yen. What I would like to know is why videogames and games machines go up in price but not things like televisions, hi-fis and videos which, like the Mega CD, are made in Japan? The unavoidable fact is that the Japanese are taking us Brits for a ride with these high prices. Look at the Mega Drive 32X, which sells for a whopping £170. By the time the Saturn, PlayStation and Ultra



Was Edge's review of Saturn *Virtua Fighter* 'shallow'? (See letter from Colm Grow)

64 arrive, the 32X will be left out in the cold.

I have noticed that Japanese companies like Panasonic, Hitachi and Aiwa are now making their products here in the UK, rather than in Japan. What I would like to know is why don't Sega and Nintendo also manufacture in the UK, which would make their products much cheaper?

Gary Osborne, Middlesbrough

You've really answered your own question: all electronic equipment which is imported from Japan is subject to the same burdens of exchange rates and import duty, which is why many companies choose to produce the hardware in the UK or elsewhere in Europe.

Sega has implied that the reason for not setting up a manufacturing centre over here is that it's massively expensive to build and tool up, and it also replicates an already capable facility in Japan. Also, both Sega and Nintendo are fiercely patriotic, so decentralising their manufacturing operation to Europe or the US is something those in charge would not be comfortable with.

Gary Osborne thinks that Japanese companies are taking consumers for a ride with high-priced ephemera like the Mega Drive 32X

There has been a surprising amount of reader reaction recently to **Edge**'s coverage of the Atari corporation. I think a lot of Atari punters don't like to be reminded about certain facts. As I own some Atari hardware, I also have an opinion, but not about your coverage.

Atari is a small company lacking corporate muscle, vision and market presence. Perhaps now people realise that it can't compete with Sega and Nintendo. However, these companies are responsible for so much formulaic and unoriginal software that the actual fun of playing games has all but disappeared. There must be about three or four 16bit console games I would actually consider worth buying. Hence the fact that my first console was a Jaguar.

While Atari has provided virtually no support for the machine so far, it has been a breath of fresh air to be able to play *Tempest 2000*. Recreating old games like this should be an integral part of Atari's strategy because it reminds us of what Atari was once very good at: being a games software innovator. Now, for whatever reason, it is slavishly following others, Sega in particular. Producing clones of *Virtua Racing* and *Virtua Fighter* for a machine whose strengths don't include producing billions of polygons smacks of poor judgement. Atari's coin-op work has also suffered. What was its last hit? Probably *Cyberball*, a sports sim that is infinitely superior to the awful *Madden* (a game that, incidentally, would make a great Jaguar conversion).

The Jaguar is a tribute to Atari's ability to come up with innovative hardware. That's not good enough, though. It needs to rediscover the spark with software, but in the meantime the *2000* series of games had better be first class. Atari should leave the dull, consumer-friendly stuff to the big boys (and, regrettably, the financial rewards as well) and get on with carving a niche as the more original gaming platform. The Jaguar's competition should probably include anything that does not carry a Sega or Nintendo badge.

Atari should also narrow its range of products and activities. Not much of a strategy, but a longterm view might seem unusually optimistic.

Martin Dean, London

Atari's strategy of releasing souped-up versions of its early titles may prove successful, but it must also bolster its catalogue with the sort of games that people want to see. And bear in mind that the likes of *Virtua Fighter* and *Ridge Racer* not only look stupendous but also play amazingly well – easily as well as any old coin-op that Atari might choose to exhume.

If the Jaguar is to remain a contender in an overcrowded market, it has to look to the next generation, not just keep an eye on the past.

What's happened? You were our last chance and now it seems you too have given us up. I am talking about reviewing new games or hardware for the PC Engine. 'What's that,' I hear you cry, 'another Engine freak whining about lack of coverage for an out-of-date machine? What does he expect, with all these fantastically powered machines being released at the moment?'

Okay, I can accept that people want to know everything about the newest consoles (I myself foam at the mouth at every PlayStation screenshot) but, as I understand it, your magazine is dedicated to the coverage of all the latest hardware. Recently, the PC Engine saw a major upgrade in

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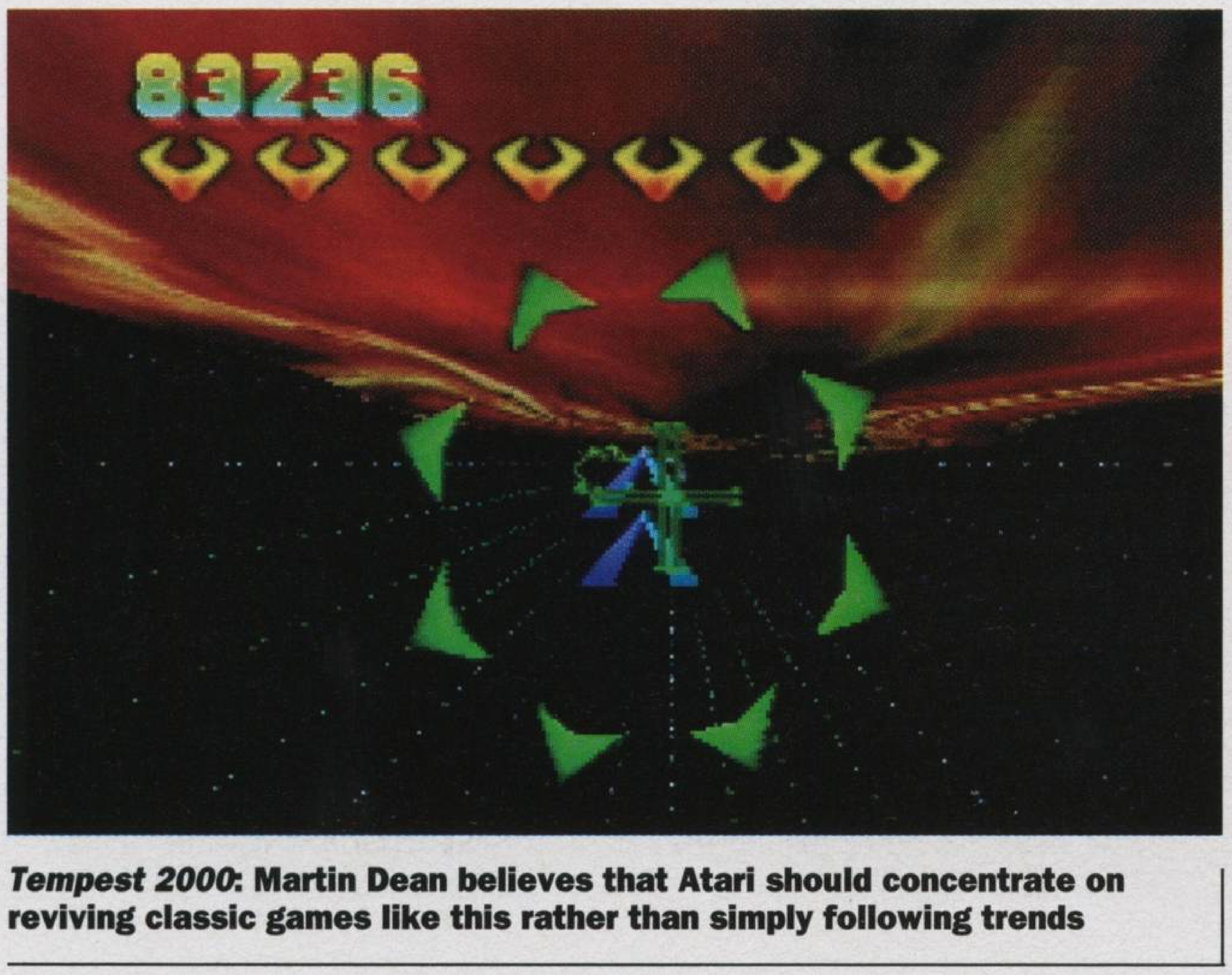
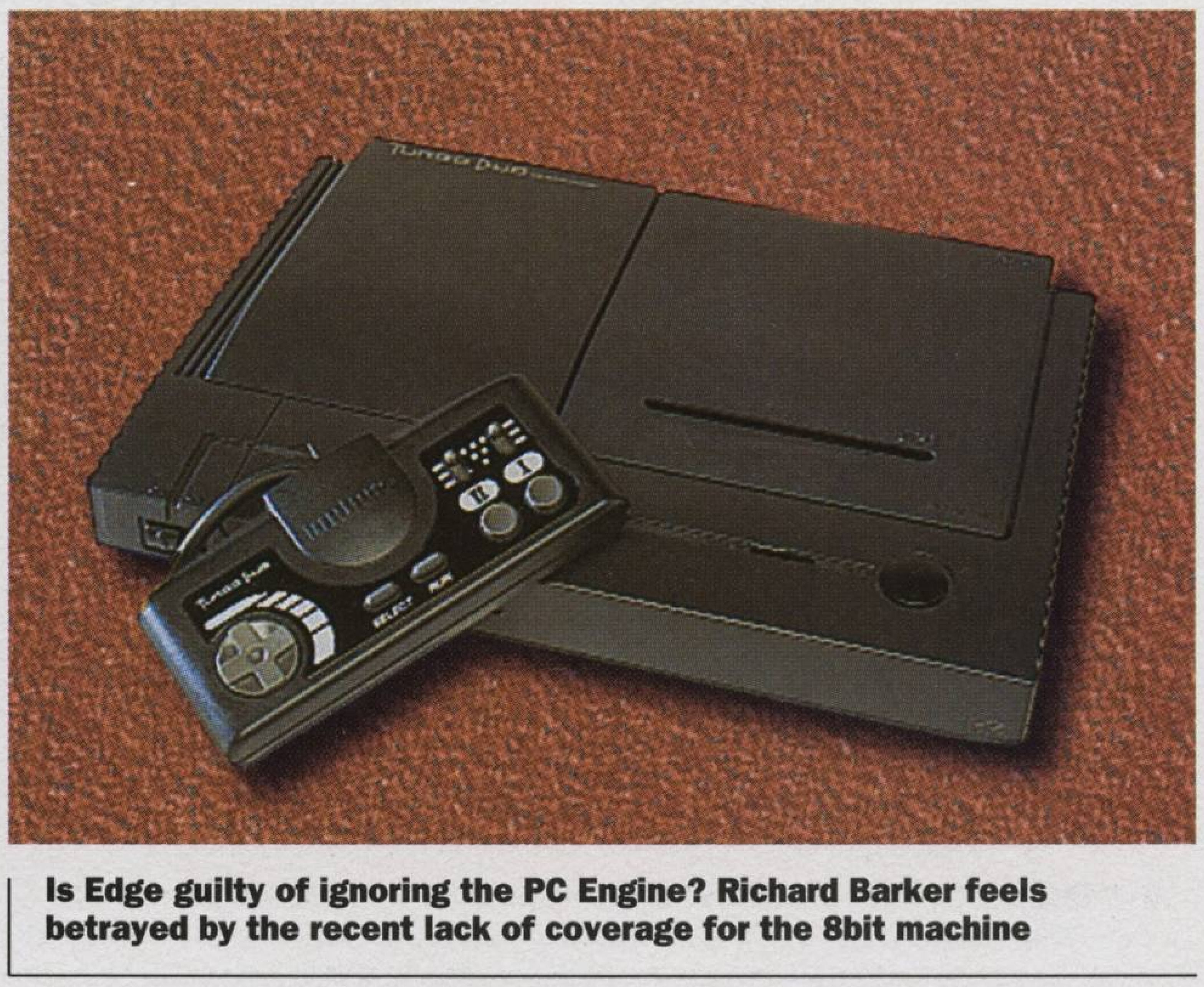


***Tempest 2000*: Martin Dean believes that Atari should concentrate on reviving classic games like this rather than simply following trends**



Is Edge guilty of ignoring the PC Engine? Richard Barker feels betrayed by the recent lack of coverage for the 8bit machine

the form of the Arcade Card, yet so far we have seen a review of one game for this (a beat 'em up, surprisingly). You used to carry the PC Engine name on your front cover (it has now been cut to NEC) but the last thing I remember you doing which was even remotely connected to NEC was the report on the PC-FX machine in issue 11.

Please, please, please continue to review Engine games (is one every couple of months for the dedicated fans too much to ask?) as you are the only magazine mature enough to appreciate their worth.

By the way, will you be reviewing software for NEC's new PC-FX console?

Richard Barker, Leeds

Unfortunately, with the number of new machines onsale or in production, something had to give. The Amiga only gets a mention once in a blue moon, and the PC Engine – which is, after all, a seven-year-old, 8bit machine – has long since departed the leading edge of videogames. Any new games are unlikely to offer any advances in game design or graphics, since the technology simply cannot keep up with current trends. That's progress for you.

When any PC-FX games are released we'll certainly take a close look at them.

I recently purchased an Atari Jaguar with the intention of settling down for a nice game of *Doom*. Unfortunately, I didn't know that good old Atari had totally undersupplied the cart, and that it's still unavailable as I write this. But that's beside the point. What struck me about the system is the quality of its soundchip. If the blurb is to be believed, not only is it 16bit, but it actually produces sound that is 'better than CD quality' (not that you'd notice by playing *Cybermorph*!). This alone opens up possibilities that companies like Atari would be stupid to ignore. I'm a musician as well as a keen gamesplayer. The last drum machine I bought set me back £300 about two years ago and is now virtually obsolete. If Atari were to release a MIDI interface for the Jaguar, perhaps containing a ROM-based drum box/sequencer and a few 'sound cartridges' it would have a package that would be irresistible to most electronic musicians.

For any console to survive for long in the current climate, it has to diversify. This is obviously a major factor in the comparative longevity of such computers as the Amiga and PC. Only recently has the PC's main selling point been the fact that it can play shit-hot games. Consoles, by contrast, can do nothing else (although you can now use your Game Boy as a personal organiser/foreign dictionary!).

Atari is no stranger to the music biz. You can argue that it was only the inclusion of MIDI ports on the ST that kept the company afloat in the mid-'80s. I bought my Jaguar thinking that I'd probably keep it for six months or so, but if Atari were to put its money where its mouth is and treat the Jaguar as the 'interactive multimedia system' that it has flamboyantly labelled it, then it might just become too useful to sell.

Andrew Gibson, Colchester

Just as the ST found a niche among musicians, the Jaguar's excellent soundchip is the key to the machine's survival, reckons Andrew Gibson

Nintendo's *Killer Instinct* coin-op 'evidence of the more adult approach to arcade games'? (See letter from Own Davies)

It's an interesting prospect, but one can't help thinking that the Jaguar has to prove itself as a games machine before launching itself upon the music and multimedia markets.

I am writing to you because, as you are a more in-depth magazine, I feel that you could tackle the issues I wish to raise.

I wouldn't describe myself as a techie anorak or a spotty computer whizzkid but, at 22, I am one of the more mature people who enjoys playing videogames. I would like to know if **Edge** thinks that the new generation of consoles (Ultra 64, PlayStation et al) will cater for the more sophisticated demands of an older market as well as the young. The kind of games I am thinking about are those that are so well served by the PC market: RPGs, challenging driving games like *IndyCar*, strategy games, flight sims and so on.

Surely in terms of marketing it would be more profitable to have a machine running a wide variety of games appealing to different ages, especially as older people seem to have more spending power. My generation has grown up with computers as games machines, and I can see these new machines having the potential to reach a broader spectrum of people than the current 16bit consoles as this generation gets older.

The more adult approach to arcade games, as seen in *Killer Instinct* and *Ultra Doom*, is promising, as is the apparently large variety of games scheduled to be released for the PlayStation, but as **Edge** is privy to the industry's future developments, I would be interested to hear what you think. It would be terribly disappointing to think of such exciting adventures in hardware technology resulting in nothing but unchallenging, facile and shallow cartoon/arcade game/film licences.

Owen Davies, Scotland

The sheer power of the new systems, plus the open licensing policy adopted for the 3DO and PlayStation and Sega's eagerness to have software of any kind on its 32bit machines, opens up doors for companies who wouldn't ordinarily write games for a console. For instance, one of the first games for the PlayStation was *A-Train*, a railway management simulation which is very much in the same vein as Microprose's classic games for the PC.

These next-generation machines might be branded 'consoles' but they are capable of doing much more than the typical platform or beat 'em up fare. Over the coming months you will be seeing software of all species, including flight simulations, management games and RPGs.

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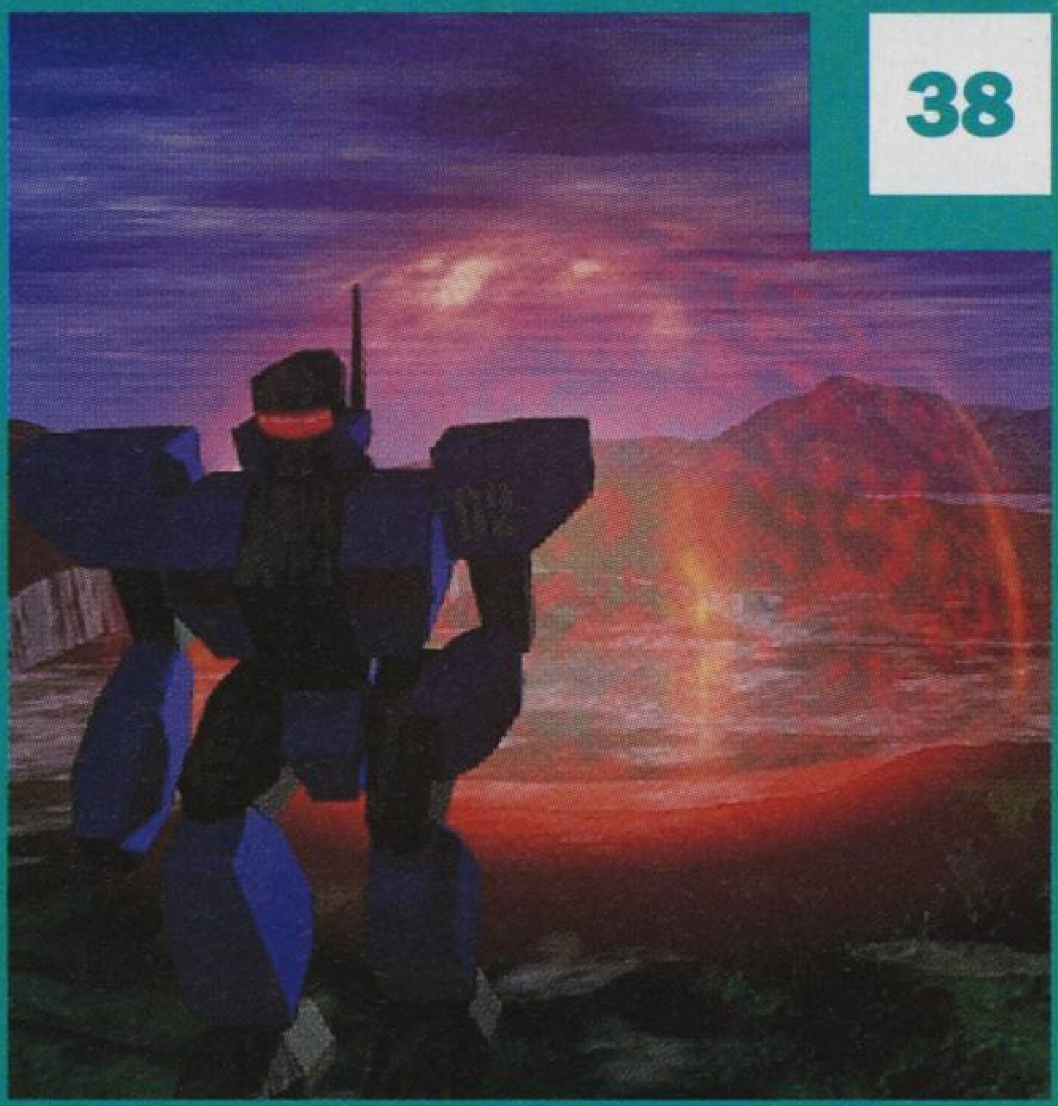

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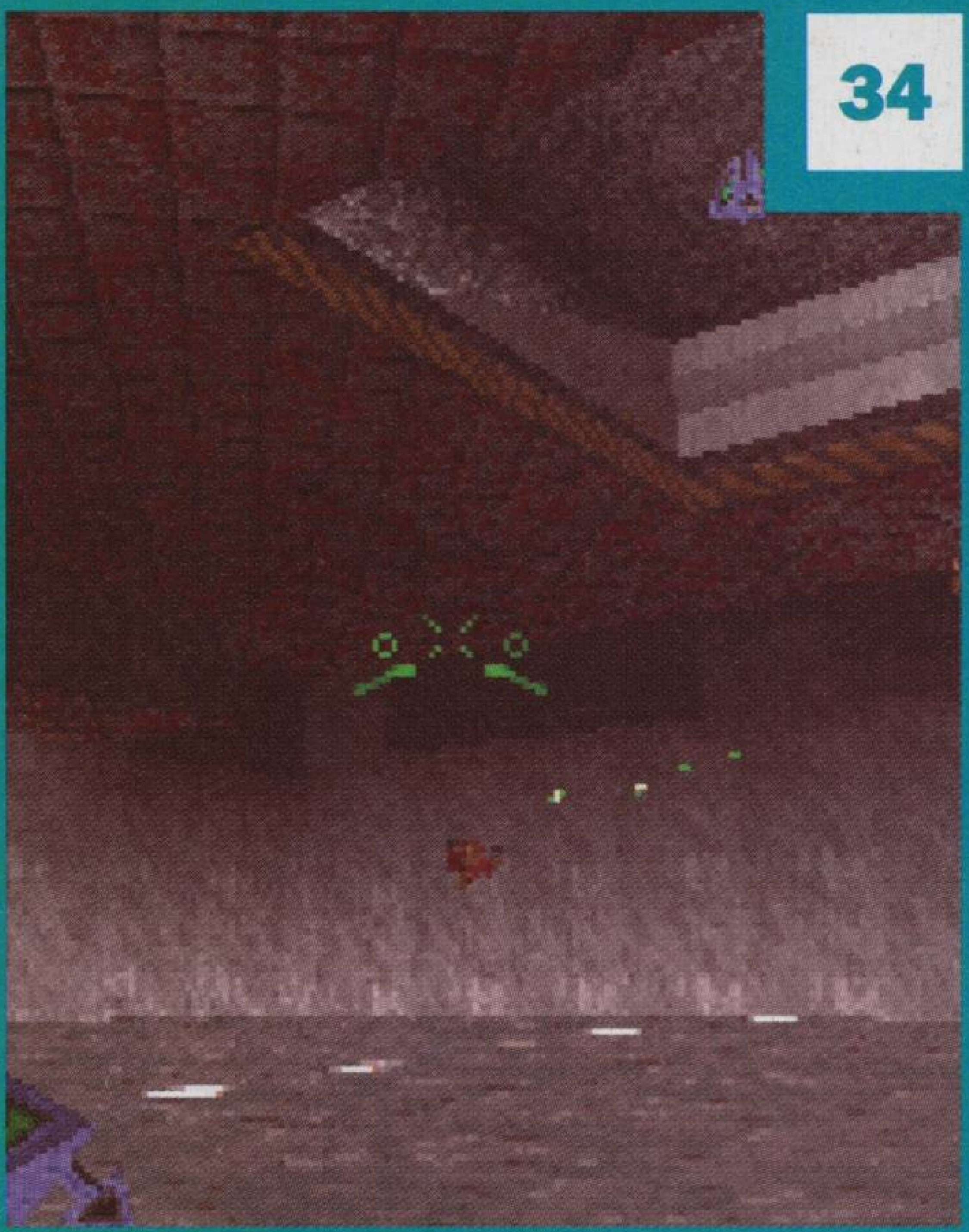

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Flight Unlimited **(above) and *Terra Nova* (bottom) – the two games that Looking Glass hopes will propel it to fame and fortune this year**

Looking Glass

One of the rising stars of the software industry is about to go supernova with a brace of games promising seductive graphics and innovative gameplay

Looking Glass Technology is about to come into its own. From its offices in Cambridge, Massachussets, it has turned out some of the most impressive and entertaining software ever produced for the PC – for other organisations. But now it is starting to expand with a couple of brand-new projects in which it has dominated all stages of production from initial concept right through to finished game. **Edge** paid a visit to this thoroughly modern firm and saw how its vision of game design is going to shape the future.

Chances are you've already played a Looking Glass game. The firm was founded in 1992 by Paul Neurath and Edward Lerner following a merger between Blue Sky Productions and Lerner Research, and now employs over 40 developers, programmers, artists and musicians. It has

You'd be forgiven for thinking that these shots are pre-rendered. Instead, Looking Glass has digitised actual aerial photographs, added contours and accurately modelled the air thermals according to the topography

come to be regarded as a centre of excellence in 3D graphics, with production credits including *Chuck Yeager's Advanced Flight Trainer*, *F-22 Interceptor*, *John Madden Football '93*, *Links Pro* and *Car And Driver*. Looking Glass also produced several highly regarded projects in association with Origin. The revolutionary 3D engine employed in *Ultima Underworld*, enhanced for *Ultima Underworld 2* and refined still further for *System Shock*, was largely the achievement of Looking Glass. The company may not be a household name just yet, but with a back catalogue like that it's well on the way.

The corporate ethos of Looking Glass is both ambitious and forward thinking. The firm feels that it is on the cutting edge of game design and is striving to push back technological frontiers, through the appliance of technology. Both of its new projects, *Flight Unlimited* and *Terra Nova: Strike Force Centauri*, share an incredible attention to physical detail, on which self-proclaimed 'mad scientist' **Seamus Blackley**, project leader on *Flight Unlimited*, places great importance. 'We're working on getting the maths right,' he says. 'Everything follows on from that.'

Looking Glass's first project, *Flight Unlimited,* is no ordinary flight simulator. The company has thrown traditional flight sim design out of the cabin window and replaced it with an entirely new system for air modelling. On top of that it has added visual effects and a level of playability that most designers could only dream of.

Since the birth of the flight simulator, one aspect has linked almost every stab at the genre: the method used to calculate aeroplane movement. Commercial flight simulators are designed to train pilots to fly under strictly controlled operating conditions and therefore the pilot's actions are likely to be predictable. If that's the case, then all you need

Seamus Blackley is the perfect project leader for *Flight Unlimited*. How many computer buffs do you know who are also maths geniuses and qualified pilots?

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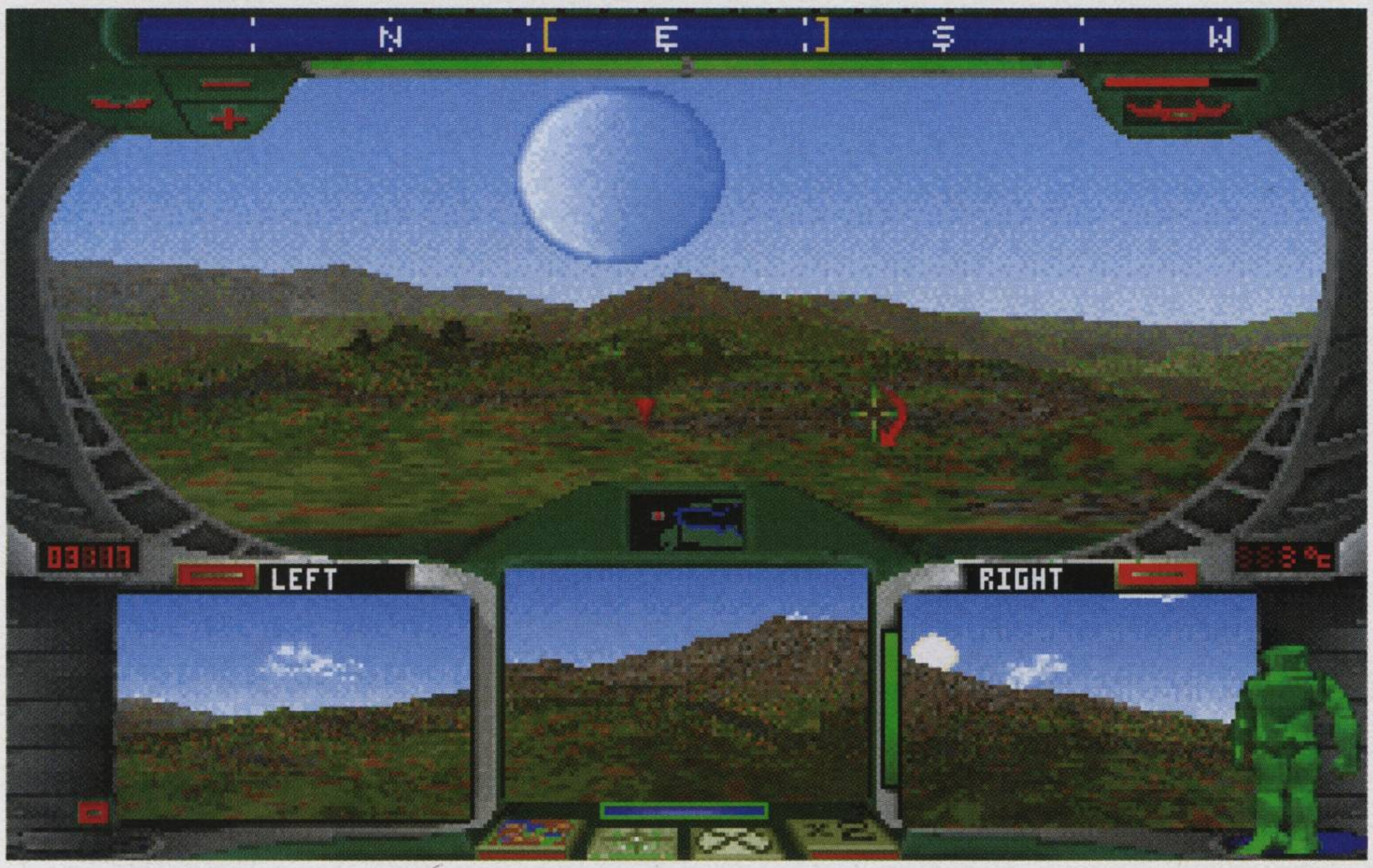
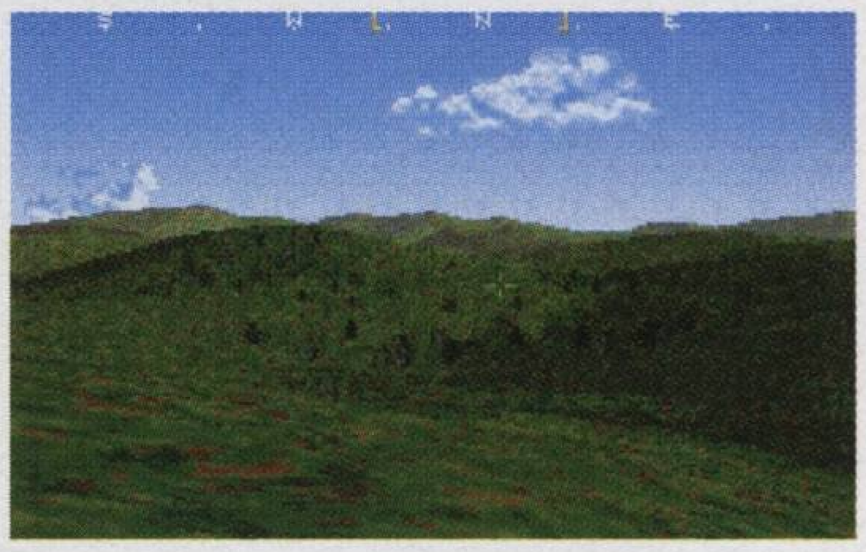
to do is play back aeroplane movement directly related to specific control movements. For example, the program knows how much movement would be caused by a standard left rudder movement, so it checks a data table and shifts the aeroplane's position according to what happened when a real pilot did the same thing in a real plane and engineers monitored it. These tables of pre-recorded flight data are called 'derivatives'.

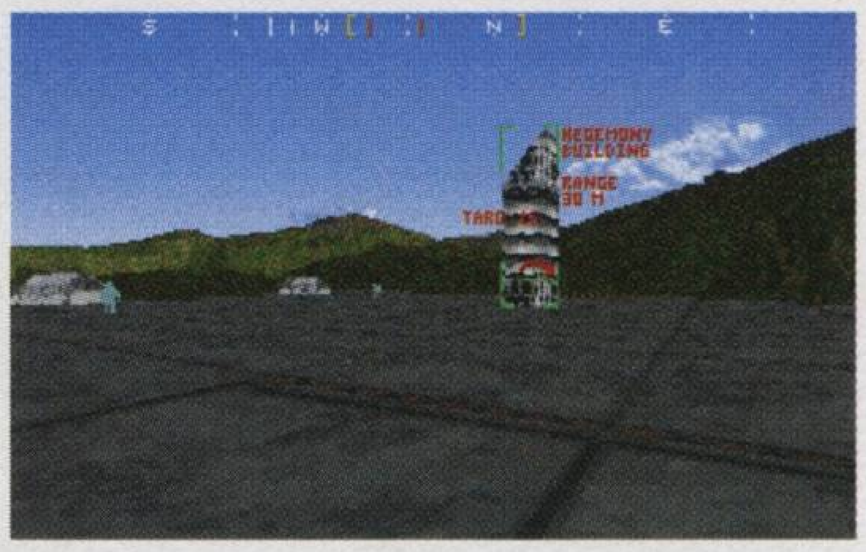
Rather than using these data sets, *Flight Unlimited* recognises that what you actually want to do when you play a flight sim is fool around and pull outrageous manoeuvres which would lose you your commercial licence in the real world. No data set could possibly predict this kind of random, irresponsible behaviour. What theoretical physicist Seamus Blackley has done instead is model the movement of air across the terrain and then see how that air would effect the changing shape of your aeroplane (it changes every time you move a control surface). As well as creating a fully aerobatic simulator, this also gives *Flight Unlimited* a tremendously fluid feel, rarely captured in other sims.

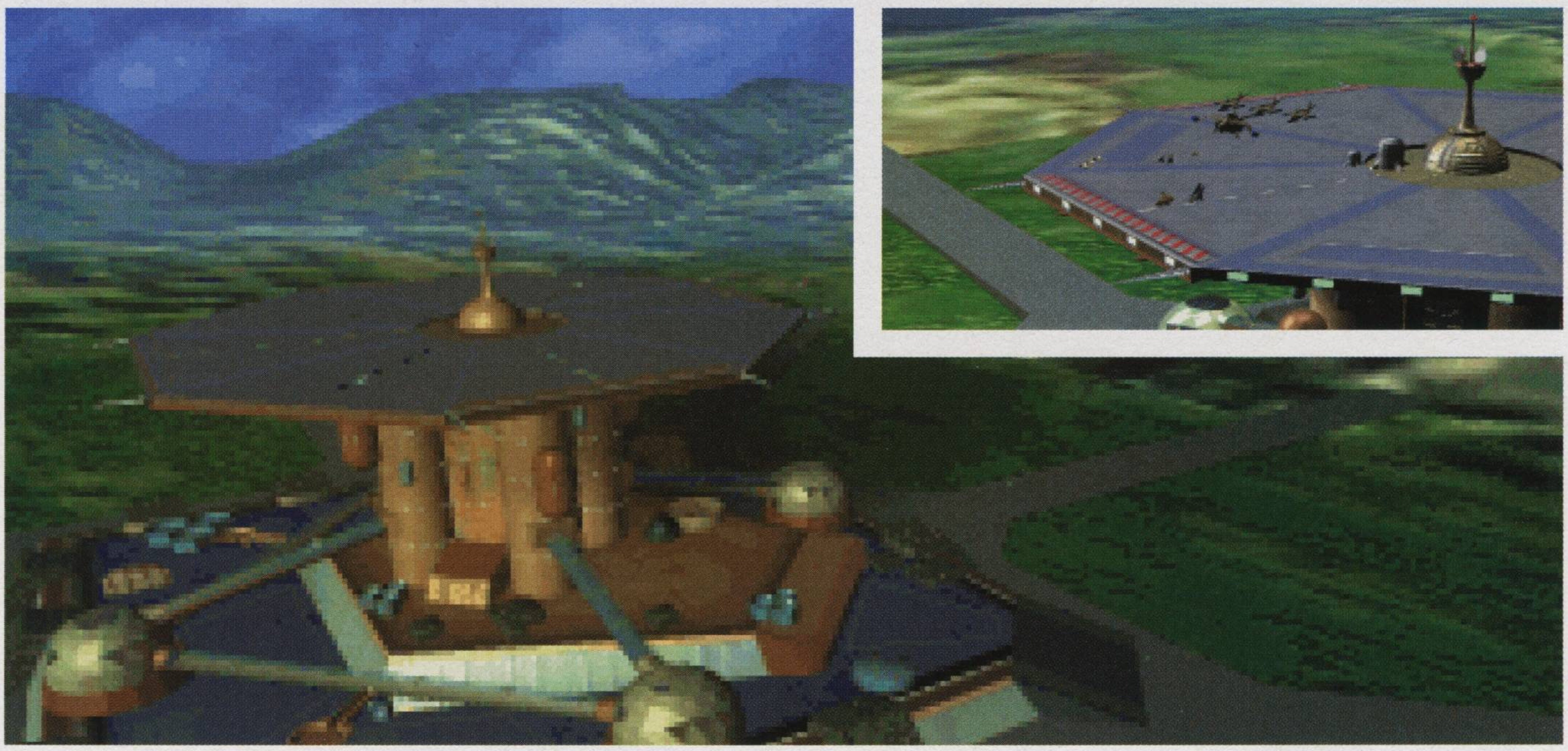
When this is combined with photorealistic ground detailing – actually based on aerial photographs – plus active terrain added from contour maps, and wonderfully drawn planes, then you're in for a seriously rich and tasty visual feast.

The sound is coming along well too. Eager sound engineers took to the skies with aerobatic pilots and recorded the engine









The little-used but fluid Voxel Space system (as seen in *Comanche*) has been enhanced in *Terra Nova: Strike Force Centauri*, with texture mapping used to limit its inherent blockiness at close range. The game's splitscreen approach (top left) lets you shoot while giving orders to your squad

The motion platform (top) uses pneumatic air from a compressor (above) to chuck would-be pilots around. It's still at the prototype stage

Looking Glass claims that *Flight Unlimited* is particularly suited to VR helmets. Seeing the horizon flip repeatedly as your plane goes into a barrel roll will induce a similar movement in your stomach

noises as they were treated to the kind of stunts the game encourages you to pull.

When you tire of just gawping at the scenery and whooshing around the skies, *Flight Unlimited* also offers a full inflight instructor which trains you in classic manoeuvres and then judges you on real aerobatic performance criteria.

When you're ready, you can also have a bash at the hoop game, a challenge which has you flying through static loops in the sky and brings more than a whiff of the SNES classic *Pilotwings* to the proceedings. At last, gamesplayers could have access to a realistic flight sim with that all too rare element of fun.

The second product in the pipeline for 1995 has only recently been given a name: *Terra Nova: Strike Force Centauri*. **Edge** visited the offices the day after that moniker had been decided and most employees were still running around calling it by its working title, *Free Fall*.

The game is a firstperson-perspective combat/strategy affair with a science-fiction plot. If you had to compare it to something currently available, it would have to be a cross between *Magic Carpet* and *UFO: Enemy Unknown*. Players lead teams of soldiers across various planet surfaces, dropping down in powered battle armour suits to fulfill around 30 missions, including attack, defence, reconnaisance and recovery.

Producer **Dan Schmidt** was keen to show off the artificial intelligence in the game. Before missions you get to hobnob with various people around the base, interacting with squad mates, learning about their specialities and seeing how they're likely to perform on missions. You can only take three squaddies on each assignment and your choice of travelling companions will have as much bearing on your chances of survival as the callouses on your joypad hand. Team members are autonomous enough to get on with the missions with the minimum of direction, and the quality of the AI means that they behave in a highly realistic manner.

Says Schmidt: 'We're really trying to get across the idea that,

Dan Schmidt, project leader on *Terra Nova*

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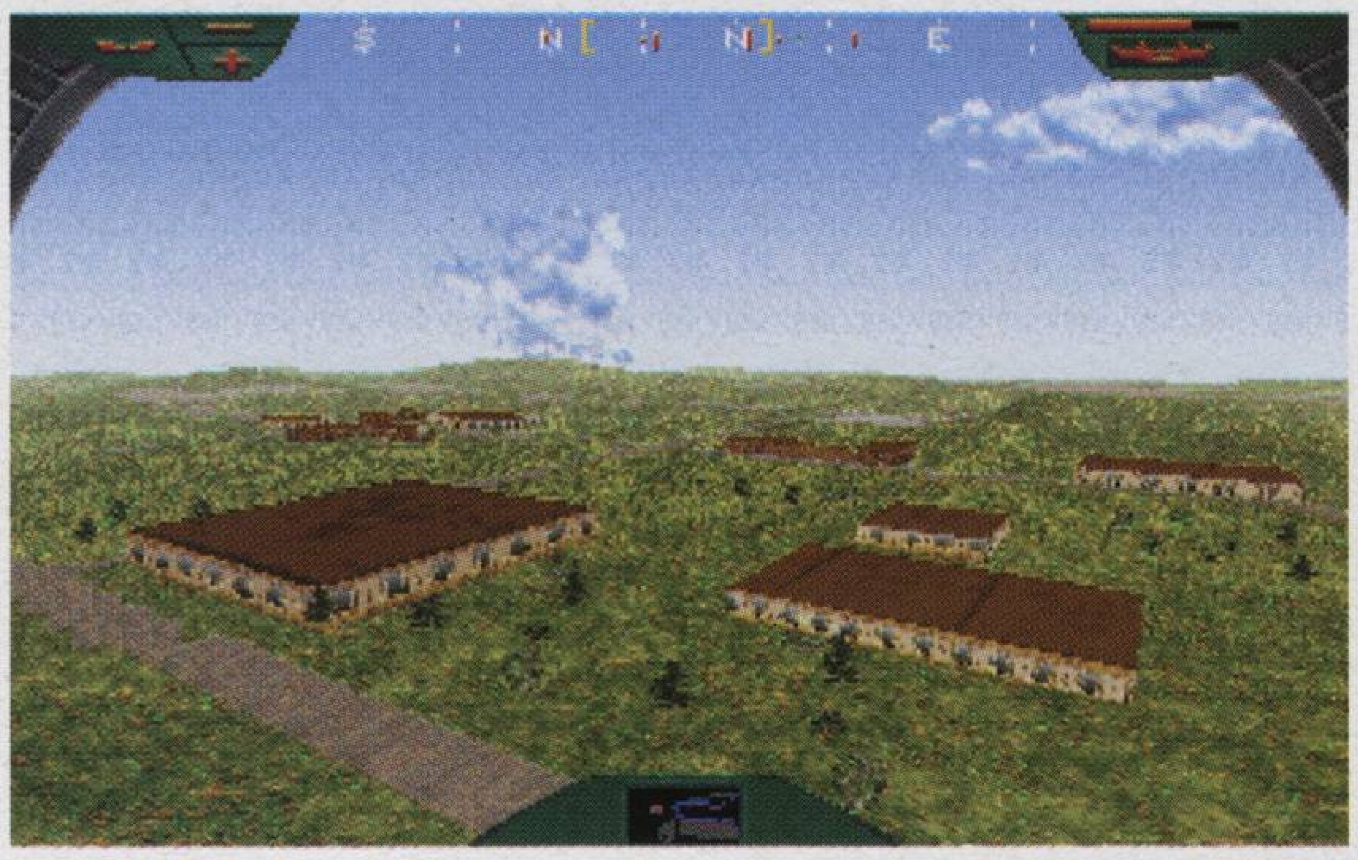
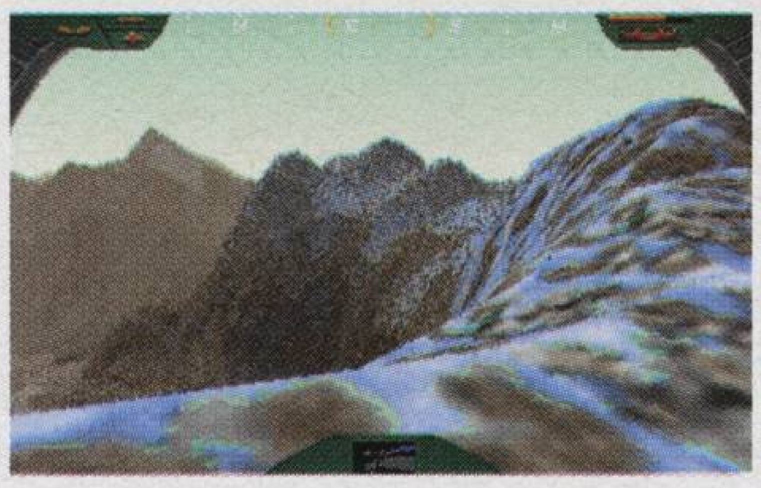


Terra Nova is a consummate blend of fluid graphics and strategic gameplay



Mountains, fields and chasms are all part of _Terra Nova_'s landscapes

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there are other humans in these suits that are also acting by themselves and you're not this one amazing guy controlling them all.'

On the early version of the game **Edge** fooled around with, it became obvious that the best way to communicate with your team-mates was by using the drone aircraft, zipping over to enemies, flying in for a closer look and then directing your men in to attack and fire when ready. You can split the screen when sending out drones, so you can be issuing orders as well as dealing out carnage yourself – all in realtime.

As for the graphics, *Terra Nova* will use Voxel landscaping in the distance but since the player is so near to the ground will employ texture maps close-up in order to avoid the dreaded blockiness which afflicted the likes of NovaLogic's *Comanche*.

This is Looking Glass's first attempt at an environment of this type but many lessons have been learned from the development of *System Shock*. The control mechanism will be similar to that game, with an onscreen cursor to target weapons and move around. While external camera views and the ability to look up and down are being implemented in *Terra Nova*, only limited tilting will be possible and no banking.

The figures themselves are not sprites but are instead based on forms designed, once again, by Seamus Blackley, who has come up with a biped simulation which reproduces the forces on various joints and parts of the body in realtime rather than using pre-scripted motion. This means that they react accurately to external forces: they trudge laboriously up hills and slide quickly down them, and are flung back realistically when hit. The action is linked by shinily pre-rendered cinematic segues, which will be familiar to every modern PC gamer.

Most of the ordinance and kit on offer comes as part of your chunky suit and includes jetpacks, radar displays, laser weapons, infrared vision and meaty rocket launchers. The game also includes a scenario builder, as well as existing missions spread across four planets – one Earth-like, one icy, another a desert, and a moon. The hope is that, as well as looking different, these locations will feature different physical properties. For example, the moon will have a lower gravity, which will have to be taken into account when firing projectiles. Geographical detailing on all the planets includes roads, underwater areas, buildings and trees.

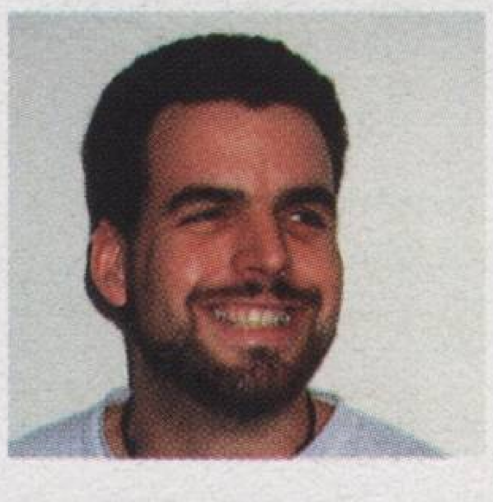
Terra Nova isn't expected until the second quarter of 1995 but is already shaping up well.

On the technology side, Looking Glass is embracing the move to virtual reality with open arms and is likely to grow into a leading virtual reality producer, since all its new products will support the most popular domestic helmets. *System Shock* is already the best PC virtual reality game and *Flight Unlimited* with a helmet is an unforgettably stomach-curdling experience.

The company is also working on a highly desirable motion platform. Expected to sell for around $3500, this bizarre pneumatic contraption will provide true *Flight Unlimited* buffs with the ultimately realistic simulation. **Edge** tried it out and the effect is truly moving.

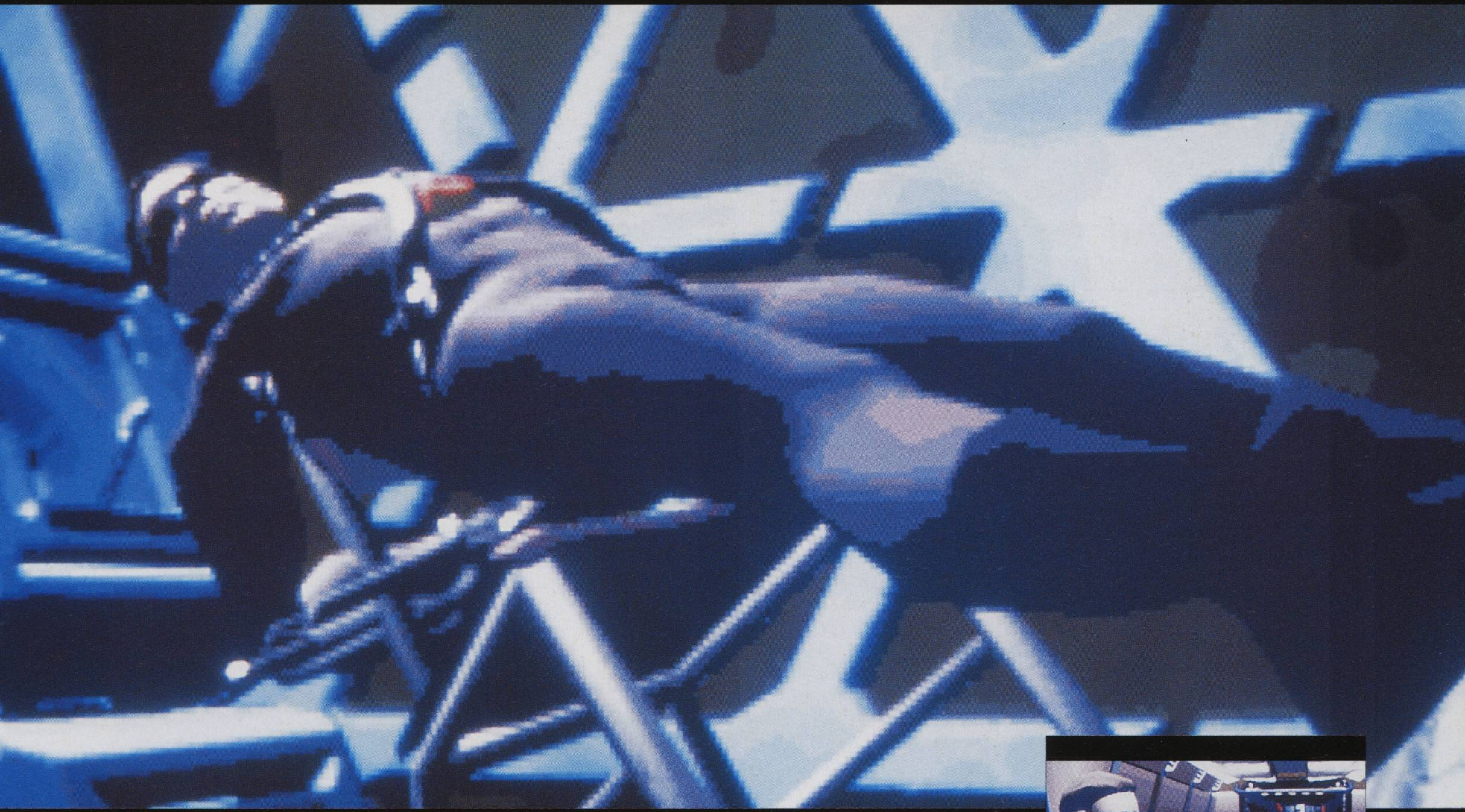
There are a couple of other things we can expect from Looking Glass. Firstly, once the non-aggressive *Flight Unlimited* is out of the door, the team will be applying its talents to the production of an air combat sim. Researchers are already gathering data to decide what era the action will be set in.

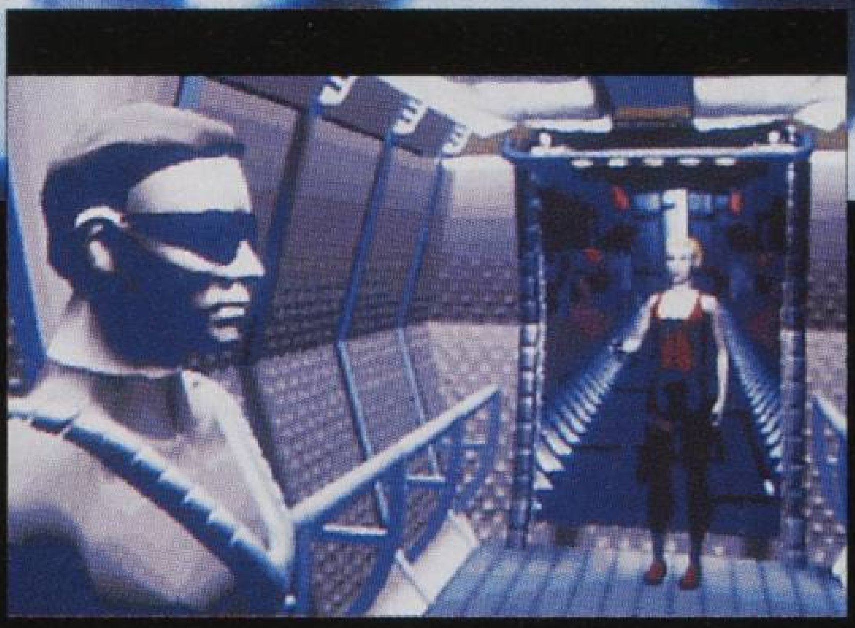
At last, now it's out of the shadows and producing its own games, Looking Glass is about to become one of the hottest properties in the videogames industry. And not before time, too.



Paul Schaffer is assistant producer on _Flight Unlimited_. His previous job – commissioning aerial photography for a US in-car navigation system – proved very useful

SENSORY DEPRIVATION





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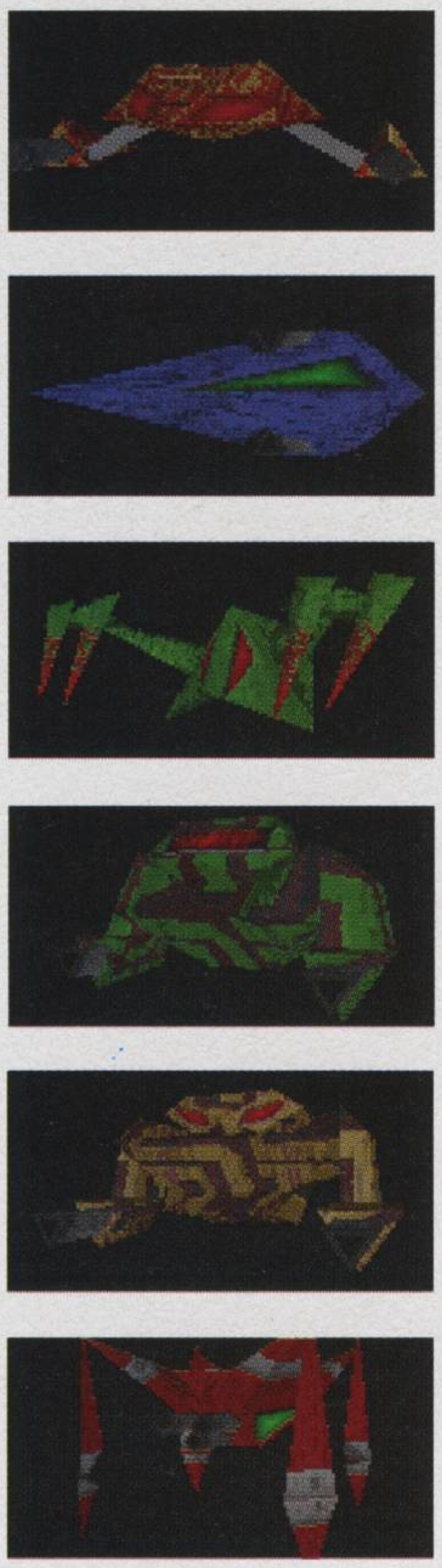
Descent

The success of *Doom* has spawned a slew of imitators. This is a game that actually takes the genre a step further

Format:	**PC**
Publisher:	**Interplay**
Developer:	**Parallax**
Release date:	**Out now**
Origin:	**US**



A selection of the easier enemies that you'll encounter during the first episode

Until recently, the prospect of a fullscreen true-3D world moving at an acceptable speed on a 486-based PC seemed impossible. *Magic Carpet* (**Edge** 16) changed all that (although, strictly speaking, a Pentium was still desirable). Now Parallax Software's *Descent* has disabused anyone who thought that Bullfrog's engine was the only one capable of achieving it.

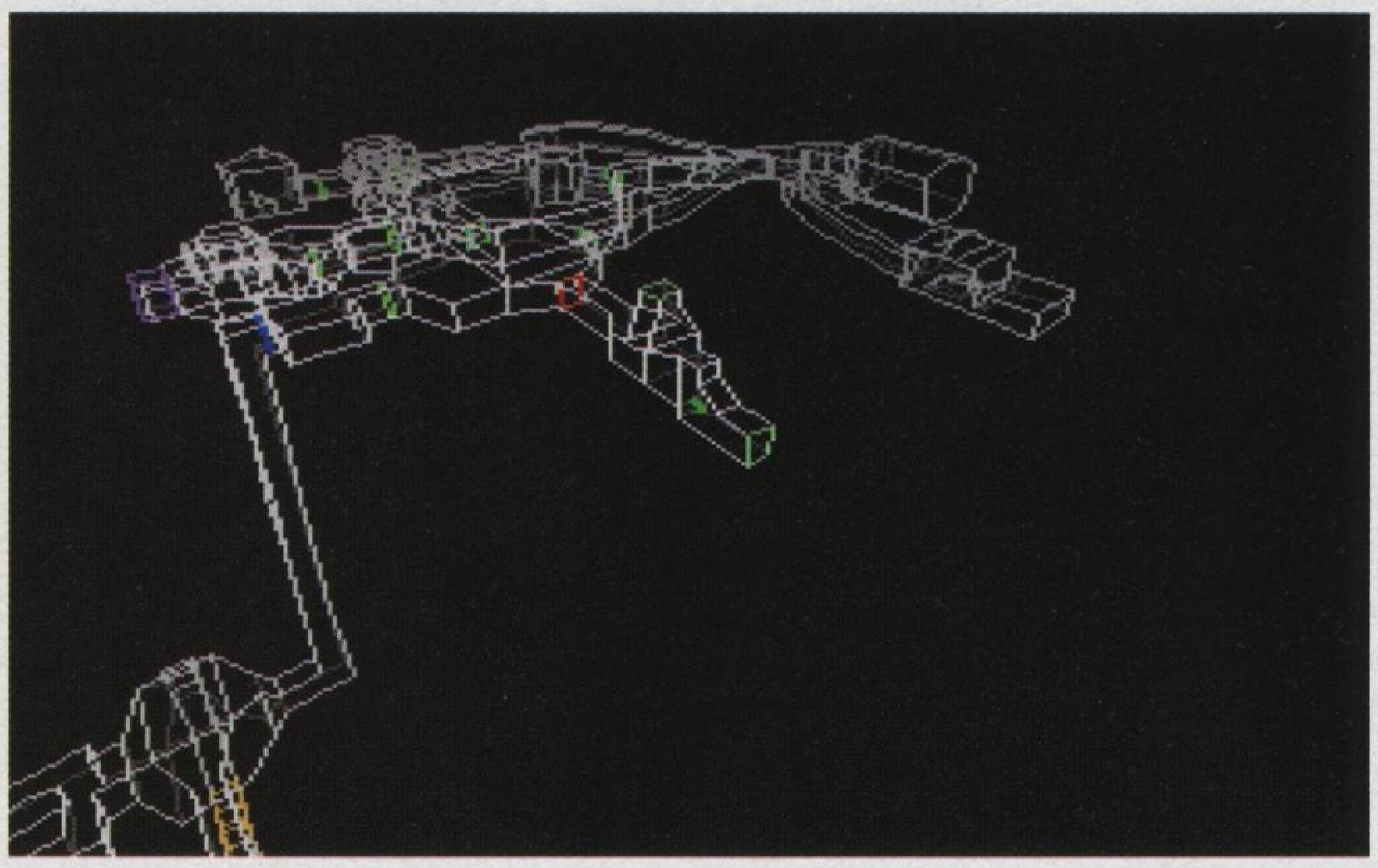
Doom has had such a profound effect on the exploration-cum-shoot 'em up genre that it's difficult to avoid drawing a comparison between it and *Descent*. And the fact that *Descent* is being offered free via bulletins boards in an obvious emulation of id's marketing strategy only serves to emphasise that similarity.

Just like *Doom*, *Descent* is packed full of weapons, power-ups and annoyingly intelligent enemies – the urge to physically peer around the monitor is overpowering. There are also secret passages hidden in the walls, floors and ceilings. Although your exploration seems random, it's actually structured so that you discover things in a set order.

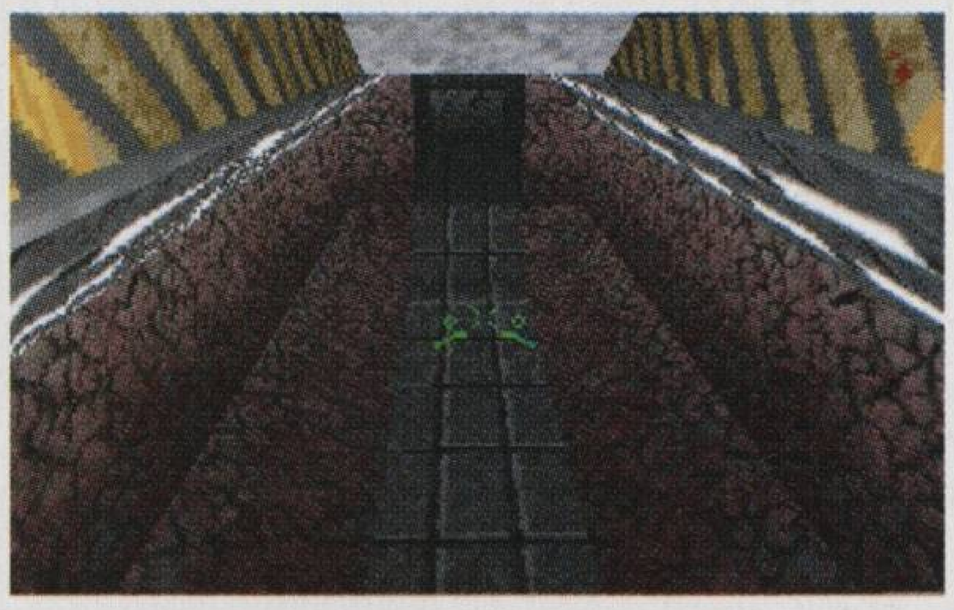
However, technically *Descent* is more akin to Origin's *Ultima Underworld* series than *Doom*, in that the player is pitched into a proper 3D environment. Piloting your spacecraft at breakneck speed through corridors and rooms, you can twist and turn and rise and fall with complete freedom.

A few blasts from your laser and your enemy disintegrates in a ball of flame. The blue globe is a shield power-up for your craft

The full version of *Descent* will offer a total of ten weapons, including missiles, proximity bombs, machine cannons and a selection of lasers.



The purple recesses (left) are proximity teleporters – beware of enemies emerging suddenly. The fully rotating 3D map (above) is one of *Descent*'s most impressive features. It can get confusing, though



When you're destroyed (main), all your power-ups remain in situ. Exiting the mine (top left). Opening a door (top right). Some of the rooms are quite spectacular (left and right). Remember, you can fly anywhere...

Lasers can be used almost indiscriminately but the more explosive devices are relatively hard to come by. The explosions that ensue when you loose them at the wide variety of enemies are satisfying but don't really match the gratifyingly gruesome mutilations in a certain other game.

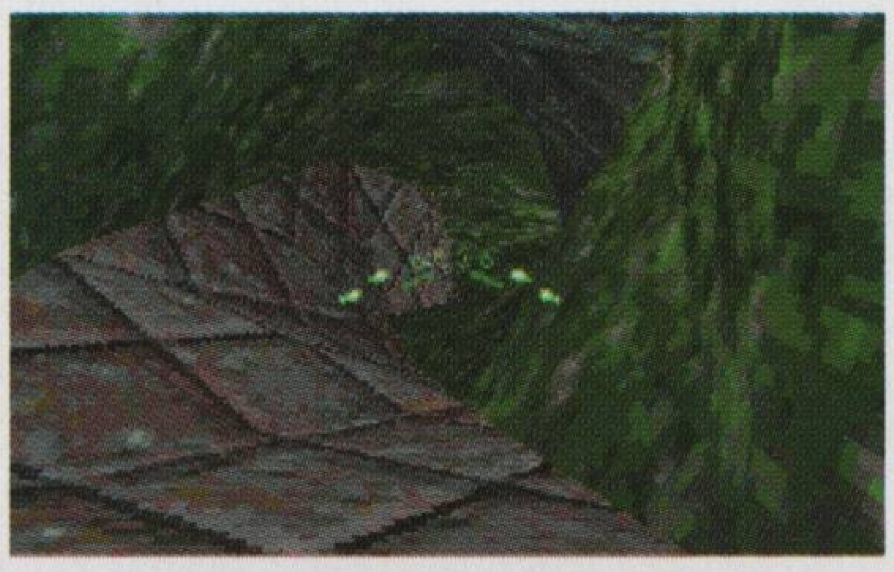
Thankfully, Parallax recognises the importance of multiplayer action (the absence of which may ultimately prevent LucasArts' *Dark Forces* from attaining classic status). In *Descent*, up to eight players can blast each other to pieces in a variety of team and individual challenges. The highly complex mine structures create an abundance of hiding places from which you can spring to attack some other hapless player.

Many people questioned the potential gameplay advantage of true 3D engines over pseudo-3D ones. Parallax Software has shown the cynics how superior real 3D is. And id Software isn't far behind. The company's forthcoming release, *Quake*, could redefine the ultimate gaming experience and make the mighty *Doom* look primitive.

Games like *Creature Shock* had the environment but not the action. The original *Wolfenstein 3D* had the action but its graphics weren't particularly revolutionary. *Descent*, on the other hand, looks like succeeding on all counts. E

The full version of *Descent* will offer a total of ten weapons, including missiles, proximity bombs, machine cannons and a selection of lasers

For bonus points, rescue all the hostages trapped in each mine (above). A psychedelic corridor (top right). Lasers can be powered up (middle right). Key cards grant access to various areas (right)



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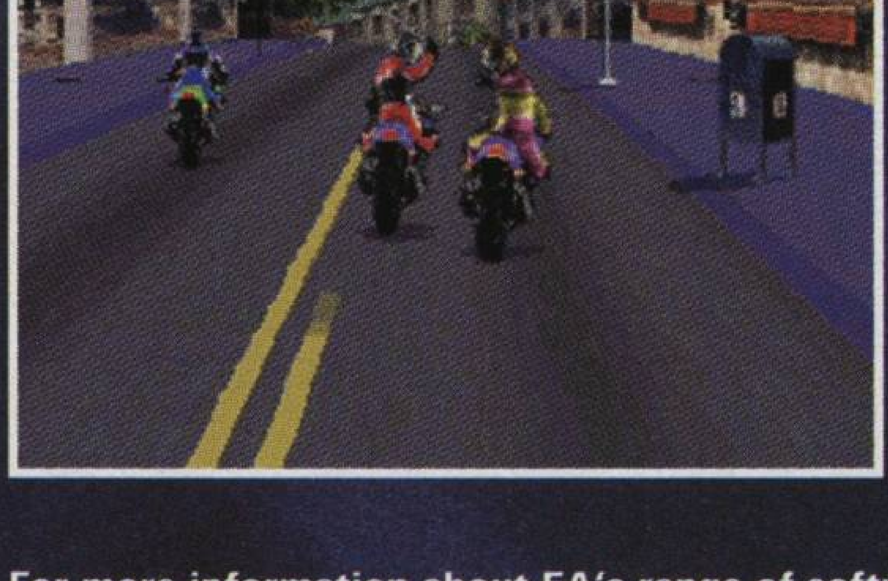

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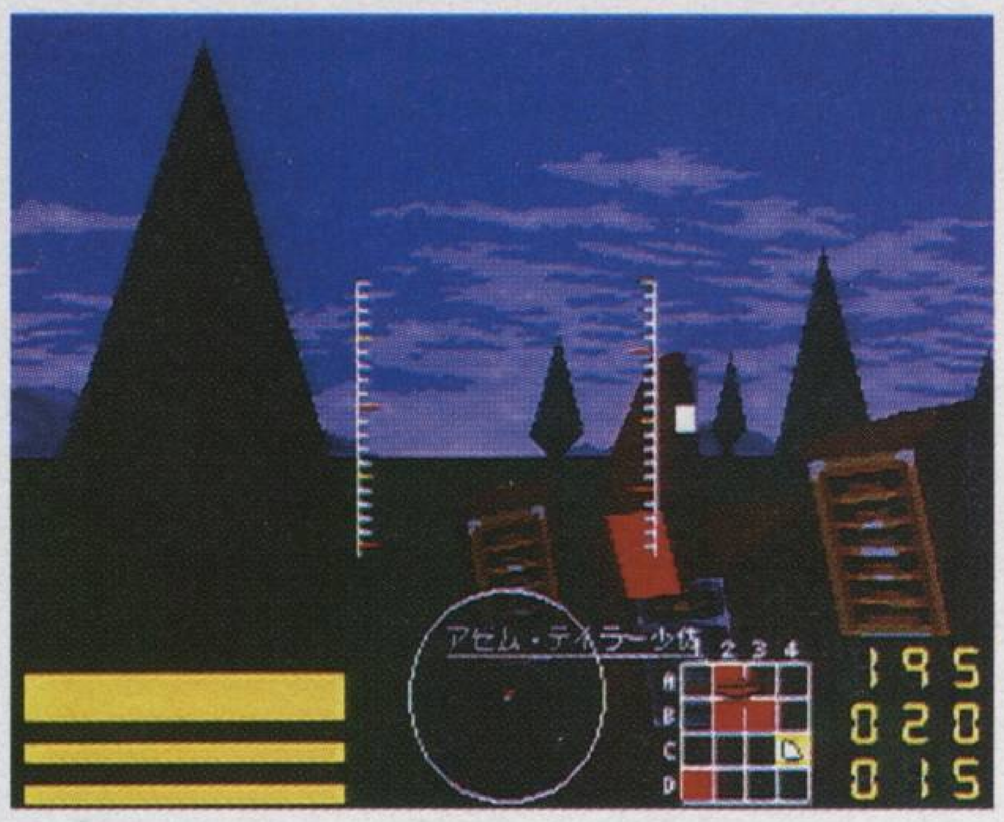
Metal Jacket

Pony Canyon's contribution to the PlayStation's burgeoning software catalogue is a strategic shoot 'em up that could prove to be an exhilarating experience

The robots are capable of some spectacular aerial manoeuvres. Leap over your opponent, turn round 180° and blast him into atoms



Night fighting requires a different set of tactics. Sneak attacks are easy but stalking around leaves you vulnerable too

Format:	**PlayStation**
Publisher:	**Pony Canyon**
Developer:	**In-house**
Release date:	**Early 1995**
Origin:	**Japan**

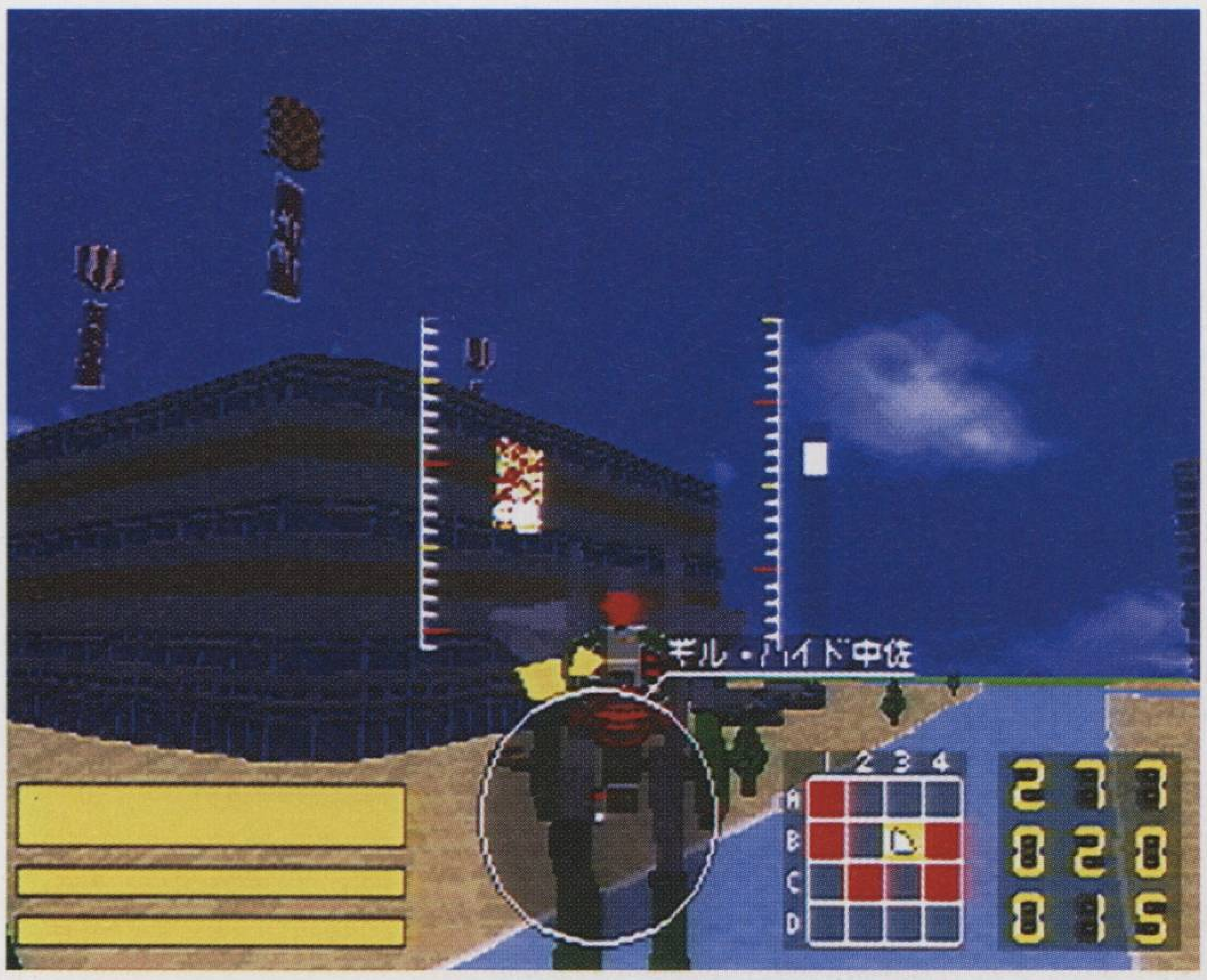
After the spectacular success of Namco's *Ridge Racer*, the second wave of PlayStation releases has some high graphical expectations to fulfil. One of the games aiming to win next-generation laurels is Pony Canyon's *Metal Jacket*, first previewed in **Edge** 13.

Metal Jacket is a tactical shoot 'em up in which the player takes control of a six-metre-tall robot and does battle with seven other intelligent robots plus assorted static ground targets. At the start of each mission you choose either Survival Mode, an unadorned slugfest, or Mission Mode, where pre-defined goals have to be attained.

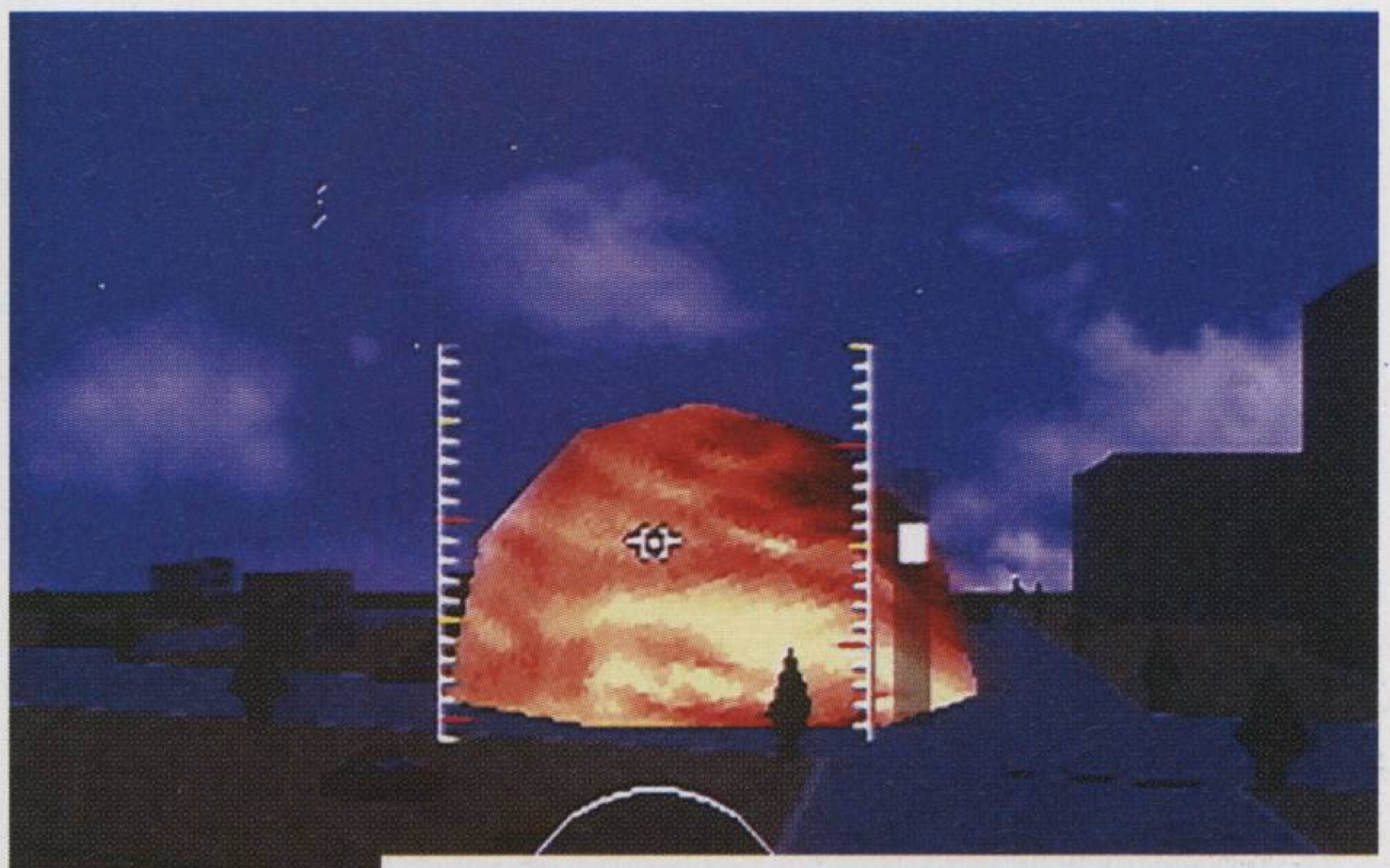
Each robot has unique strengths and weaknesses, and pre-battle decisions affect the tactics used during the missions. For example, armour can be concentrated on the front if you plan to take a direct line to an enemy

There are six combat zones, including a city, a forest and a desert, each with variable battle conditions

Pre-rendered sequences will be used intermittently in *Metal Jacket* to depict crucial events in full colour. Here, a robot has a lucky escape



Fighting up to eight other robots at once can lead to some hectic action. The sights and displays offer you guidance, but ultimately it's down to you



An explosion consumes an enemy robot (top). All the mechs can be customised to suit individual tastes and tactics (above)

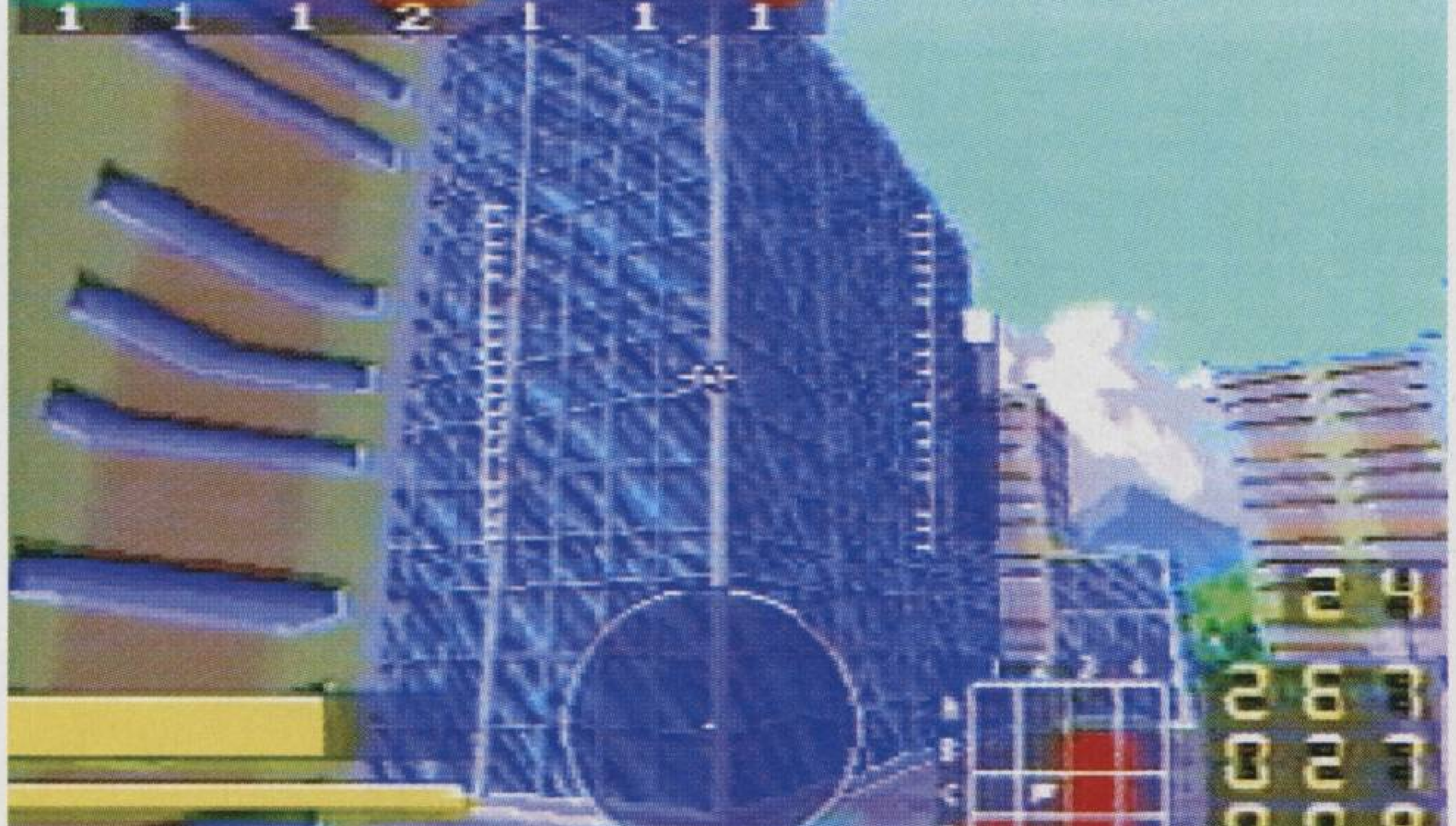
or to the rear if you favour hit-and-run guerrilla methods. As a robot receives damage, its response times increase and gauges start to malfunction.

Pony Canyon's original plan was to concentrate on the game's graphics, but because of the small programming team (there are only two dedicated programmers on the project) and the fact that the power of the final hardware was unknown, the gameplay became the main focus instead.

'Because the PlayStation is a new machine, we could not accurately judge hardware capabilities like the polygon limits, speed and sound,' admits co-producer **Seiji Toda**.

Ironically, this lack of knowledge has proved a blessing. Although the game uses a mere 16 colours and each robot consists of only 300 polygons, Pony Canyon has devoted a great deal of effort to developing different scenarios. There are six combat zones, including a city, a forest and a desert, each with variable battle conditions.

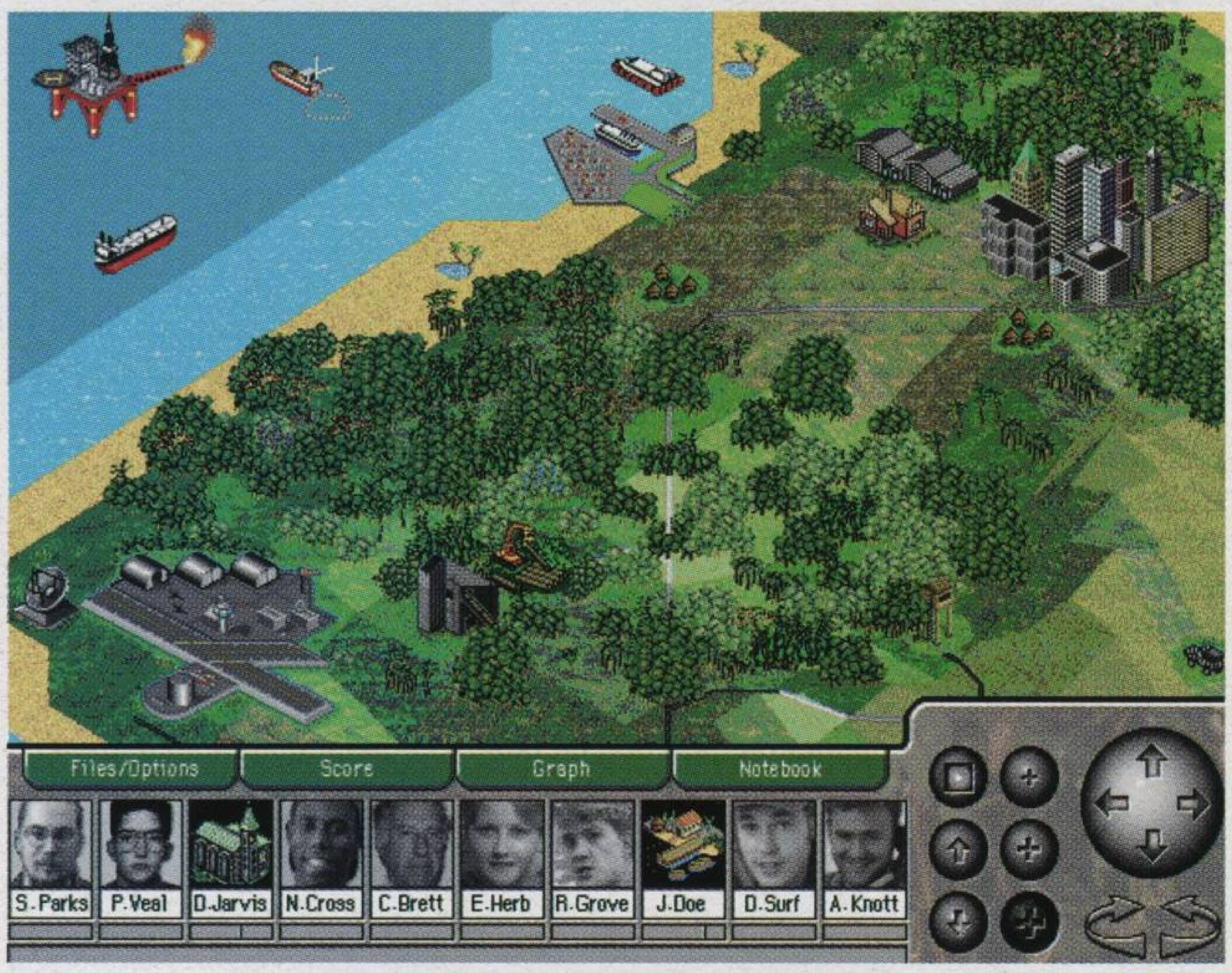
'The game is generally around 60% complete but some elements are only 30% finished,' says **Masayoshi Yamamiya**, *Metal Jacket*'s other co-producer. 'We're working on the multiplayer facility in particular but are being hampered by Sony not releasing the connecting lead. The Japanese version will have a twoplayer option only. However, it is hoped that foreign versions will offer the full eightplayer capability.'

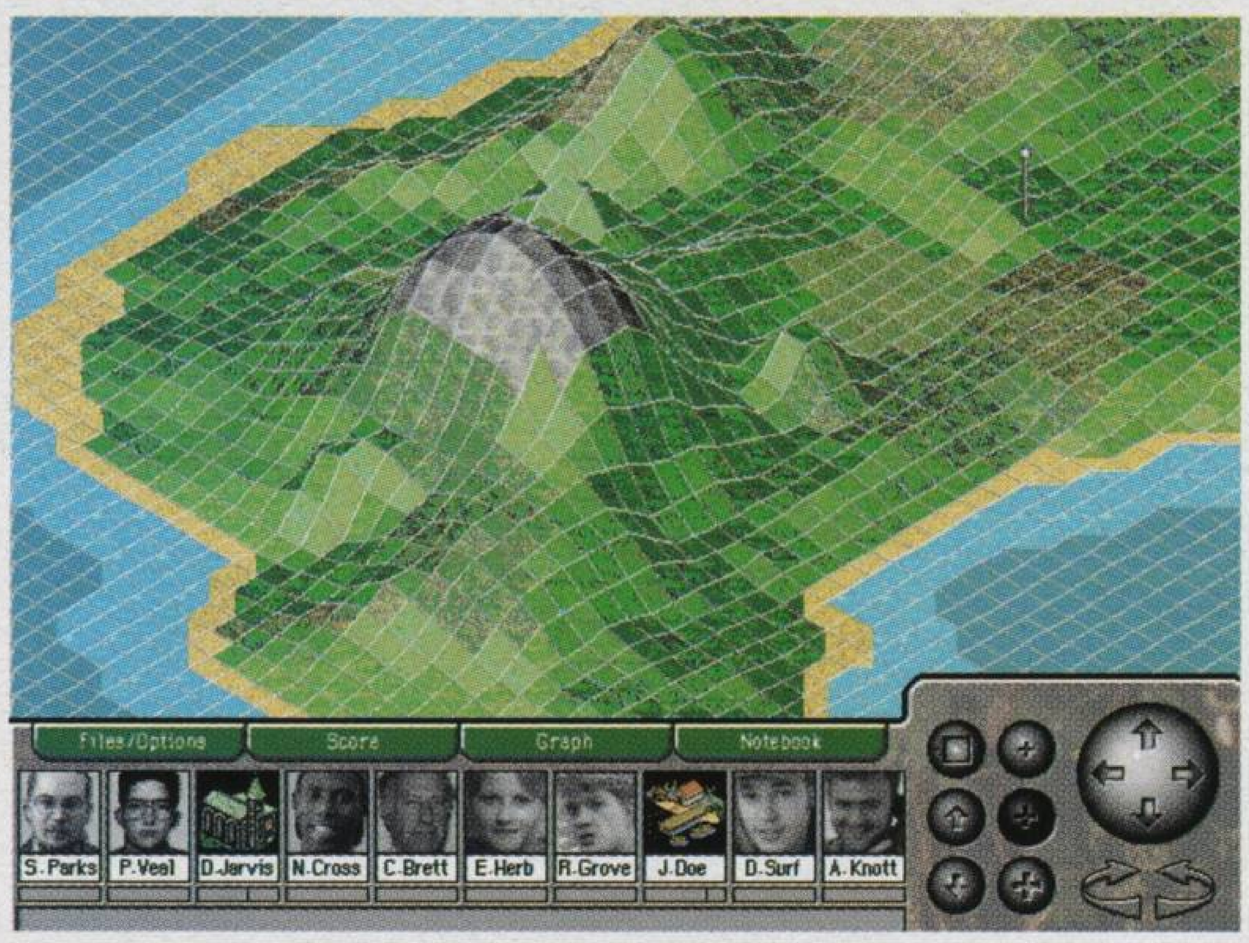


All these buildings (left) provide ideal cover. Your sights track a doomed robot (right). *Metal Jacket* was designed as a multiplayer game, but unfortunately the PlayStation link-up cable is now not due for release until March

SimIsle

Destroy an island paradise or preserve its natural beauty – the choice is yours in Maxis' new PC simulation





Fly the tourists in over the oil rig and show them the deforestation their presence is causing (top). Topographic grids can be used to assist planning (middle). A friendlier map (bottom)

Format:	**PC CD-ROM**
Publisher:	**Maxis**
Developer:	**Intelligent**
Release date:	**April 1995**
Origin:	**UK**

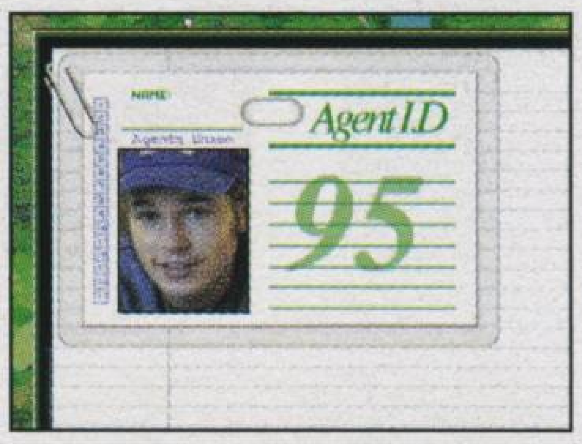
Maxis' ability to produce engrossing simulation games has never really been in question, but the danger is that it will eventually run out of things to 'sim'. Luckily for addicts, that point hasn't been reached yet.

SimIsle is Intelligent Games' first contribution to the field. The game is set on an island which was initially covered by lush rainforests and populated only by native tribes but now faces the onslaught of 20th-century capitalism. This idyllic spot is not only in danger of being swamped by tourists but also offers billions of barrels of oil, logging, and a handy base for drug barons.

The environmentally friendly will try and protect this Eden, but many will no doubt be lured by the lucrative development opportunities on offer. Competition with rival companies, industrial disasters, sabotage and global warming will affect all involved.

Behind the moral questions lurks what looks like a highly playable and technically competent game. All the views are presented in fully light-sourced SVGA and the range of scenery ensures that it doesn't become repetitive. The entire view can be zoomed in and out and rotated.

SimIsle hopefully marks Maxis' return to accessible and enjoyable simulations, rather than the tedious statistical exercises it



Zoom out for an overview of your island (top). Recruit special agents (middle). Meet the indigenous people (bottom)

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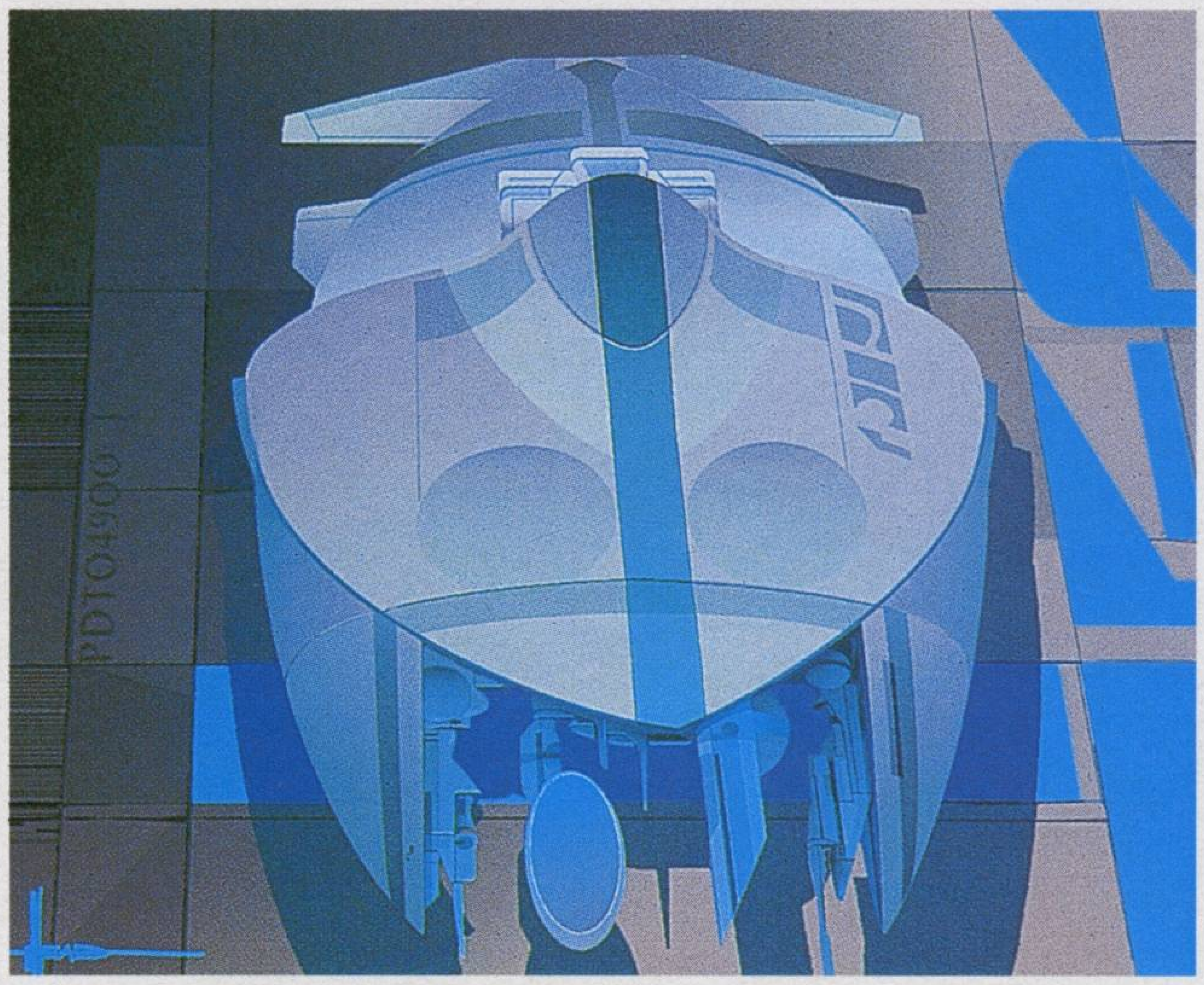
Grand Chaser

The most graphically impressive of *Grand Chaser*'s circuits is a lava-filled track that weaves between dark mountains

Sega's adaptation of CyberDreams' Syd Mead-designed PC racer, *CyberRace*, is nearing completion for the Saturn

Format:	**Saturn**
Publisher:	**Sega**
Developer:	**In-house**
Release date:	**February**
Origin:	**US**



Sega's *Grand Chaser* was originally called *Grand Racer* but was renamed to avoid confusion with another Saturn title, *Gale Racer*. The game is actually a loose adaptation of CyberDreams' year-old PC title, *CyberRace* – a thoroughly average space race game bloated with elaborate story sequences. The out-of-cockpit view and the bland Voxel-like terrain are gone and instead there's an impressive texture-mapped polygon roadway and multiple behind-the-action views.

Grand Chaser is a combat race game featuring heavily armoured sleds which float a few centimetres above the ground and can reach speeds of 500kph – more with turbo boost engaged. Onscreen indicators include a radar, a map of the circuit and a proximity sensor.

Much of the original PC *CyberRace* was designed by Syd Mead, whose Hollywood credits include Blade Runner and 2010. A flaming river of lava weaving through dark mountain passes is the most spectacular-looking course in the Saturn title, but the game's graphics are let down by the bare polygons of the sleds – it's not clear if they will be texture mapped in the finished version.

The gauges on this rather empty screen betray *Grand Chaser*'s combat element

On the face of it, *Grand Chaser* bears very little resemblance to the original CyberDreams PC title, *CyberRace*

The game camera moves around the sleds as they race along the track

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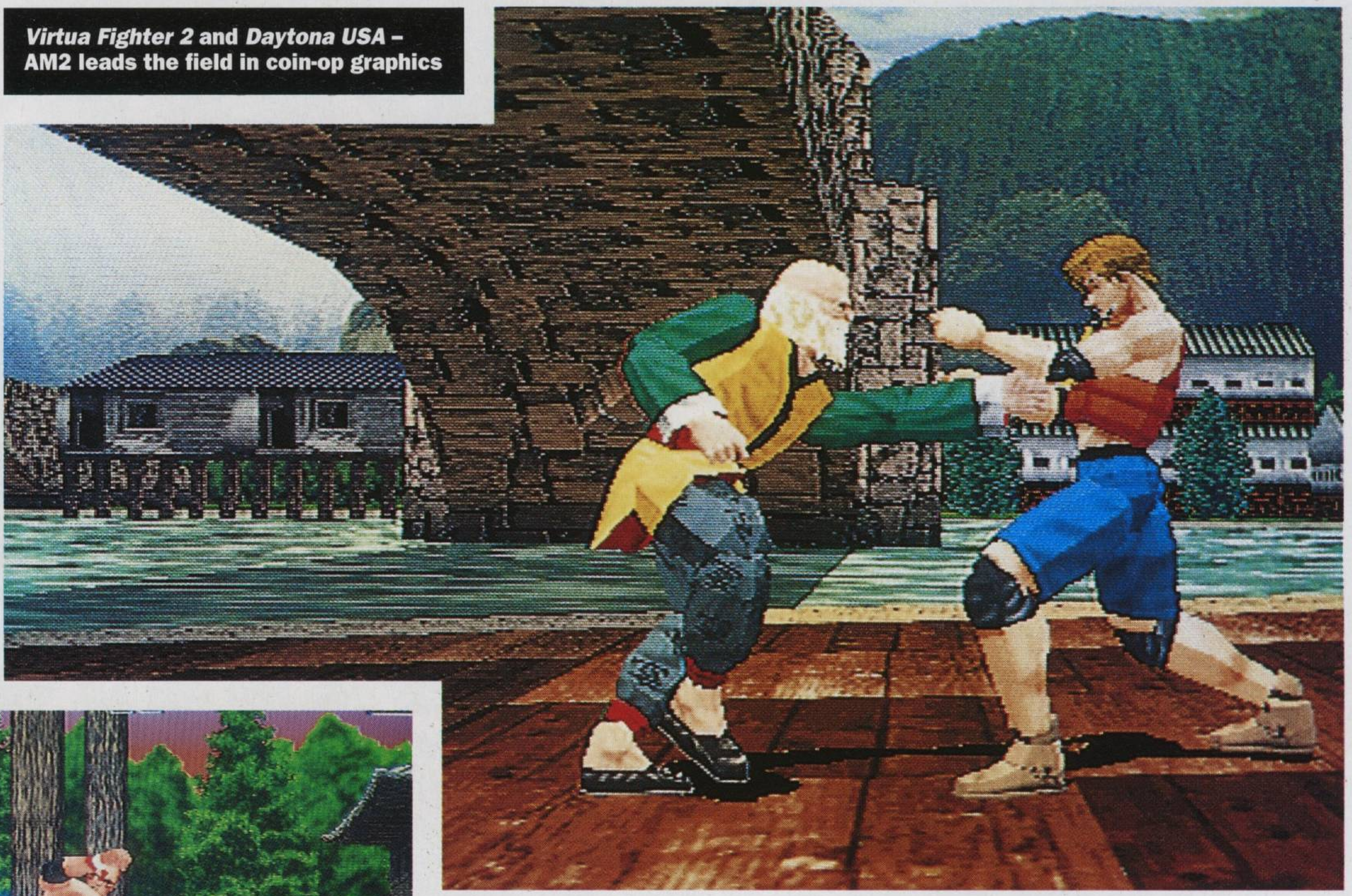


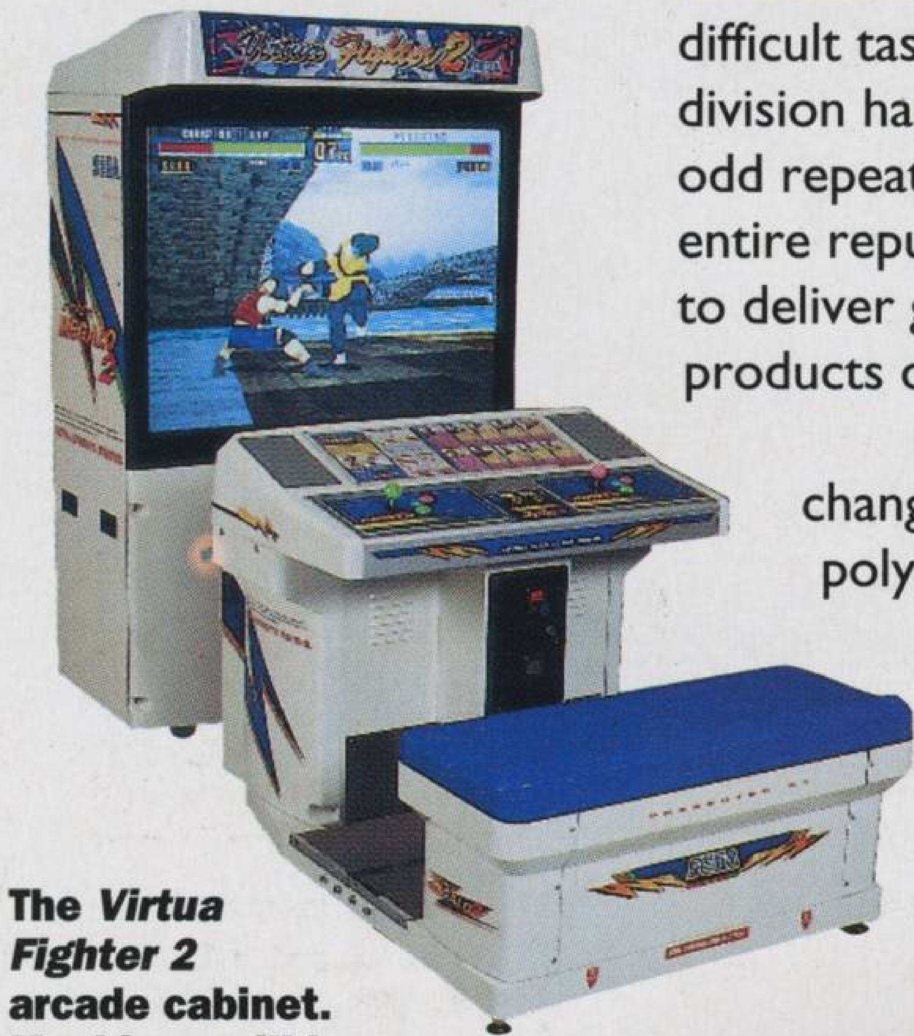
Virtua Fighter 2 and *Daytona USA* – AM2 leads the field in coin-op graphics

AM2

The Saturn has fared well in the traditionally non-Sega Japanese market. The reason: *Virtua Fighter*. Edge visited its creators, AM2

Following a major gaming achievement with something of equal quality is a notoriously difficult task. Sega's AM2 arcade division hasn't just enjoyed the odd repeated success but built an entire reputation upon its ability to deliver groundbreaking products on a regular basis.

After singlehandedly changing the perceptions of polygons in a gaming environment with *Virtua Racing*, it went on to incorporate the same graphics engine in *Virtua Fighter*. The game became one of the most popular coin-ops in Japan's colourful videogames history. And *Virtua Fighter 2*, released in late 1994 in Japan, has proved to be an even bigger success.



The *Virtua Fighter 2* arcade cabinet. Machines will be appearing here in large numbers soon

'The success of *Virtua Fighter 2* hit maximum levels,' revealed Mr **Kurokawa**, Sega Of Japan's chief publicity manager. 'When one person leaves the machine in an arcade another person immediately takes his place – the machines are permanently in use.'

People who haven't played either game in the series may find it difficult to fathom their appeal. There are no *Street Fighter II*-style special moves; instead, the fighters use more traditional techniques, and their kicks, punches and throws can seem a somewhat diluted experience at first sight.

But the success of both machines is easily explained, according to Kurokawa: 'Fighting games in general are very popular in Japan right now. The fact that *Virtua Fighter* maintained its popularity over an extended period is due to our handling of the games' secret moves. We

Mr Kurokawa and a small selection of the 100 or so items of merchandise which accompany *Virtua Fighter* (left). Sega's coin-op testing area (right)

The dynamics that made *Virtua Fighter* such a memorable title have been carried over to its glorious sequel

Although PlayStation *Toh Shin Den* turns heads, it doesn't match *Virtua Fighter 2*'s Model 2-generated visuals

Virtua Fighter 2's backdrops differ greatly from the first game. Instead of flat horizon views it incorporates proper 3D features

deliberately didn't publicise all the moves at the same time but instead revealed them to gamers one at a time by means of the Japanese videogames press. The same policy applies to *Virtua Fighter 2* – all of the moves will be released by February in Japan.'

Although the series has pulled crowds in Japan, the reception in Europe and the States has been less enthusiastic. 'European gamers seem less interested than Japanese when it comes to the secret moves,' believes Kurokawa. 'But we still intend to release the special moves for *Virtua Fighter 2* gradually in Europe.'

Using exactly the same Model 2 board as *Daytona USA*, it took AM2's team around 12 months to produce *VF2*. Sega is reluctant to reveal the game's polygon count, but it is known that the characters themselves use fewer polygons because of the extra texture mapping employed.

The series is far from finished. 'We have already begun work on *Virtua Fighter 3*,' announced Kurokawa. '*Virtua Fighter 2* has a Chinese theme, but the next game will have a different influence. We may also increase the number of characters available. Actually, during the development of *Virtua Fighter 2* we designed four new characters but only two made it into the game: Shun and Lion.'

Beyond the furthering of the *Virtua Fighter* cause, AM2 is continuing to demonstrate an interest in the Saturn. After its explosive porting of the original, work is under way on the sequel's conversion. 'Saturn *Virtua Fighter 2* production has started,' Kurokawa disclosed. 'The characters have already been animated on the development workstation so body movements are possible, but we haven't done the attacks yet.'

As well as a *Daytona USA* conversion – now 40-50% complete – AM2 is soon to begin work on a Saturn version of *Virtua Cop*. It will also be producing games for the ST-V board. 'We are concentrating particularly on developing original software for the ST-V,' stated Kurokawa.

Kurokawa also talked about Sega's US launch policy for the Saturn during **Edge**'s visit: 'The marketing positioning is different. When the Saturn is released in America the MPEG, CD-V and Photo CD systems will be available. The machine will be sold more as a home multimedia machine than a games machine.'

Whichever way Sega approaches the American launch, if the machine can cause such waves in a territory relatively foreign to Sega in terms of sales, its success on more familiar ground is pretty much assured. With AM2 behind it, it's certainly difficult to see how it can fail.

Given that AM2's conversion of *Daytona USA* is still only 40-50% complete, a Saturn version of *Virtua Fighter 2* is unlikely to appear before autumn 1995

Sega's first ST-V title, *Golden Axe: The Duel*, is likely to head Saturnwards

Sega Rally's attract mode features dozens of jawdropping sequences

AM3

Sega's newest arcade division is aiming to put itself on the map with an ultrarealistic rally simulation. Edge dropped in for a look-see

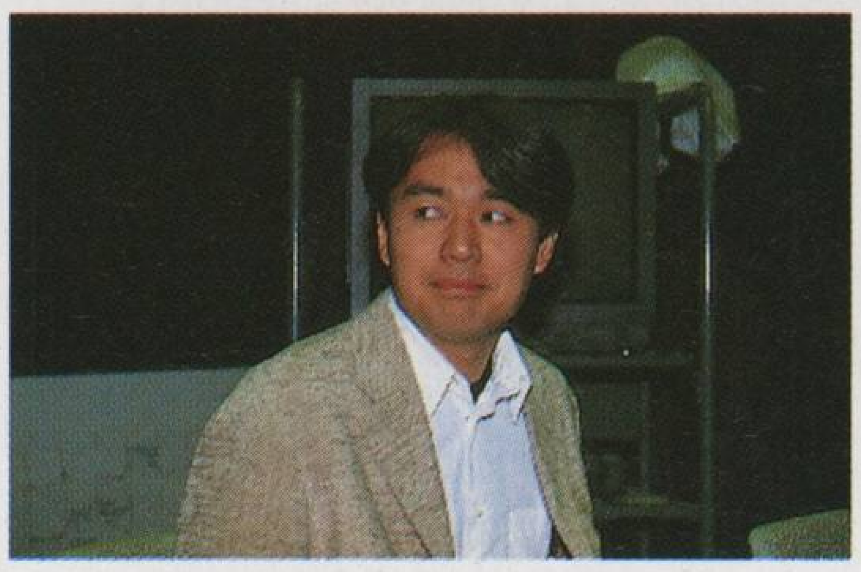
Sega is shifting up a corporate gear in an attempt to dominate the competitive arcade driving game market. After AM2's worldbeating *Daytona USA* comes *Sega Rally*, an even more ambitious game, developed in-house by fledgling team AM3.

'We wanted to make a racing game that was very different to all the others out there,' declared **Kenji Sasaki**, the project's director and designer. 'We were really impressed by rally as a sport in America and Europe and felt it could work well as a videogame.'

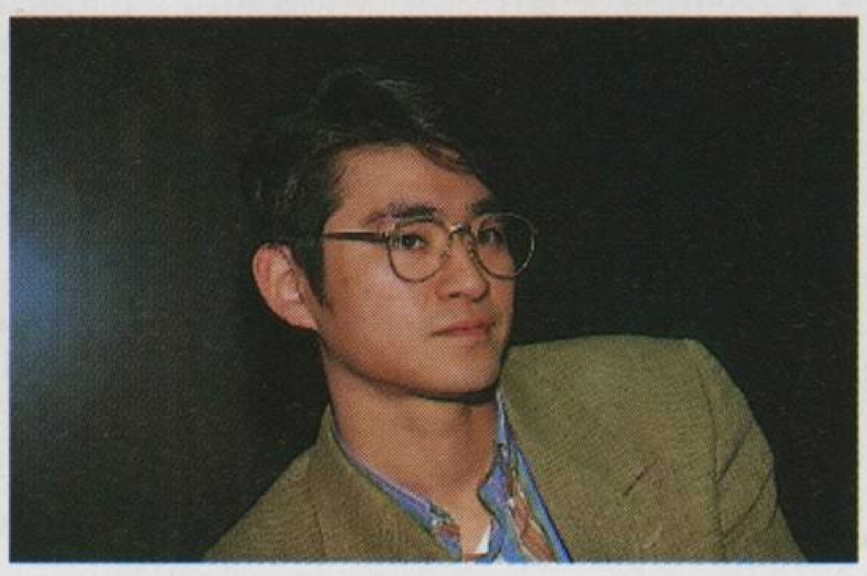
By entering into a partnership with renowned rally car manufacturers, AM3 has been able to incorporate a more realistic feel into *Sega Rally*. The 1992 World Rally Championship-winning Lancia Delta appears in the game alongside a 1994 Toyota Celica, thanks to an unusually relaxed agreement between the three companies. No licence fees were even discussed as the car engineers involved were pleased to assist with the project.

Edge played an unfinished version of the game during its visit. Although there are still numerous cosmetic changes to be

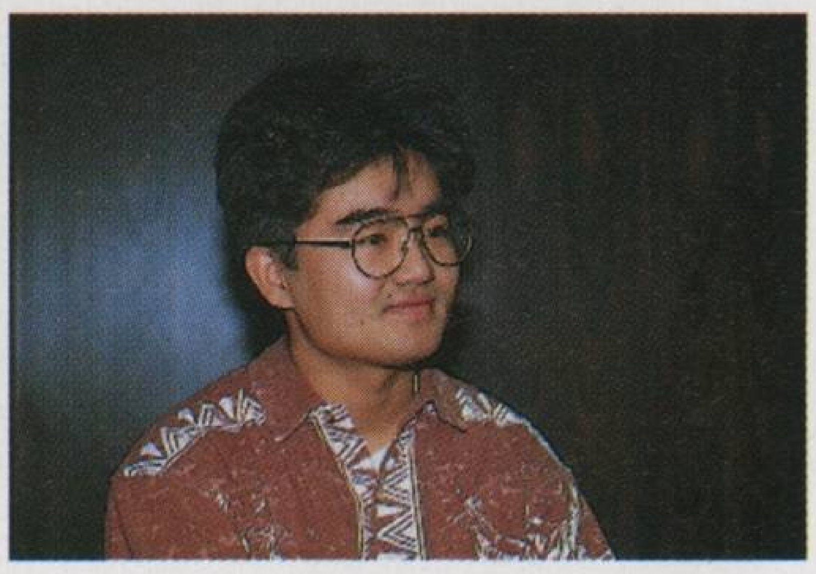
The *Sega Rally* coin-op will feature AM3's 'active shock generator'



The project's designer, Kenji Sasaki, also created the game's press ads



Producer Tetsuya Mizuguchi is a big fan of real-life rally racing



Sohei Yamamoto, who previously programmed the *Star Wars* coin-op

Like Namco's ***Ridge Racer 2, Sega Rally*****'s cockpit features a rear-view mirror for extra realism**

The texture-mapping capability of the Model 2 board has allowed the AM3 team to go overboard with car decals

implemented – such as spectators and animals appearing trackside – the driving feel itself is mightily impressive. The speed of the cars is obviously lower than *Daytona USA*'s (at around 200kmh maximum) but play is still brisk and the rally environment is totally engaging. Certainly, the stage-by-stage rally format provides more variety than *Daytona USA*'s oval tracks, and the cars themselves are more interesting when you get behind the wheel.

'The game also uses something we call an active shock generator,' explained producer **Tetsuya Mizuguchi**. 'This makes it feel more realistic. The seating moves to relay the relationship with the road and it also reacts to knocks with opponents' cars. The cabinet features steering feedback and we also concentrated on trying to make the soundtrack convey reality.' The cabinet actually contains two independent motors to achieve these effects, compared to the single device in the *Daytona USA* cabinet.

Daytona USA is enhanced by the opportunity to play with a group of friends. Mizuguchi has similar plans for *Sega Rally*: 'Four players can compete against each other with a linked setup. It will be possible to choose among different cars, and not only will the car colours differ but also the characteristics of the cars.'

AM3 has laboured long and hard over the look of the game. Its efforts are eased by a Model 2 board now in its second generation and more powerful than the version incorporated in *VF2*. Although the latest board still lacks true transparency effects, the team has emulated them by means of careful programming. In contrast to *Daytona USA*'s greyed-out windows, the cars in *Sega Rally* have translucent panes – it's possible to see the driver through the rear window, and occasionally even cars in the distance beyond that. In general, the level of detail is significantly higher than *Daytona USA*'s and AM3 is confident that the finished product will look superior to the efforts of its close neighbours.

At the programming helm is **Sohei Yamamoto**, whose past work includes *Moonwalker*, *Rail Chase* and *Star Wars*. He revealed that there have been hiccups. 'The skidding of the cars through bends was the most difficult point to realise,' he admitted. 'The jumps that the cars take over bumps were also hard work.'

However, *Sega Rally* is shaping up and promises to be an experience to beat even *Daytona USA*. UK gamers will be able to test the machine when it appears here in March/April. E

As well as a practice mode, *Sega Rally* will offer three levels of competition. A bonus stage is set in northern Europe

Toyota and Lancia engineers assisted AM3 with the cars' dynamics and performance. The game looks set to be the most thrilling driving coin-op yet

An AM3 sound technician gets to grips with *Rally*'s aural content

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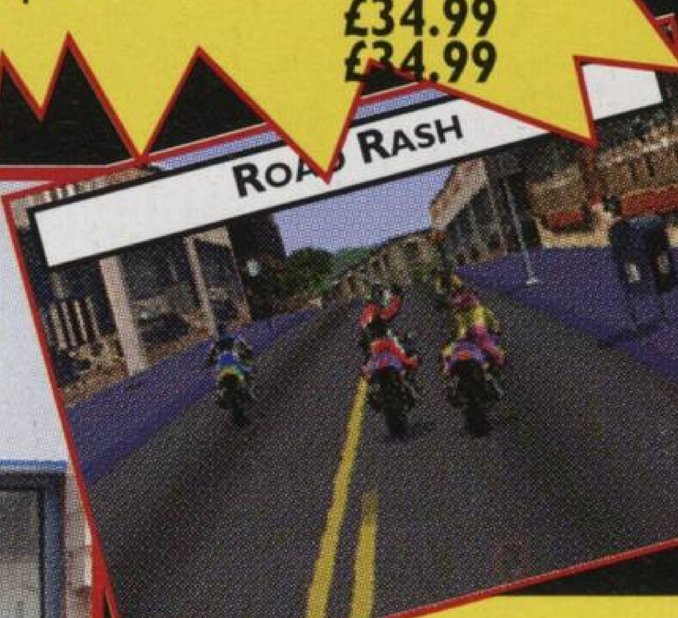

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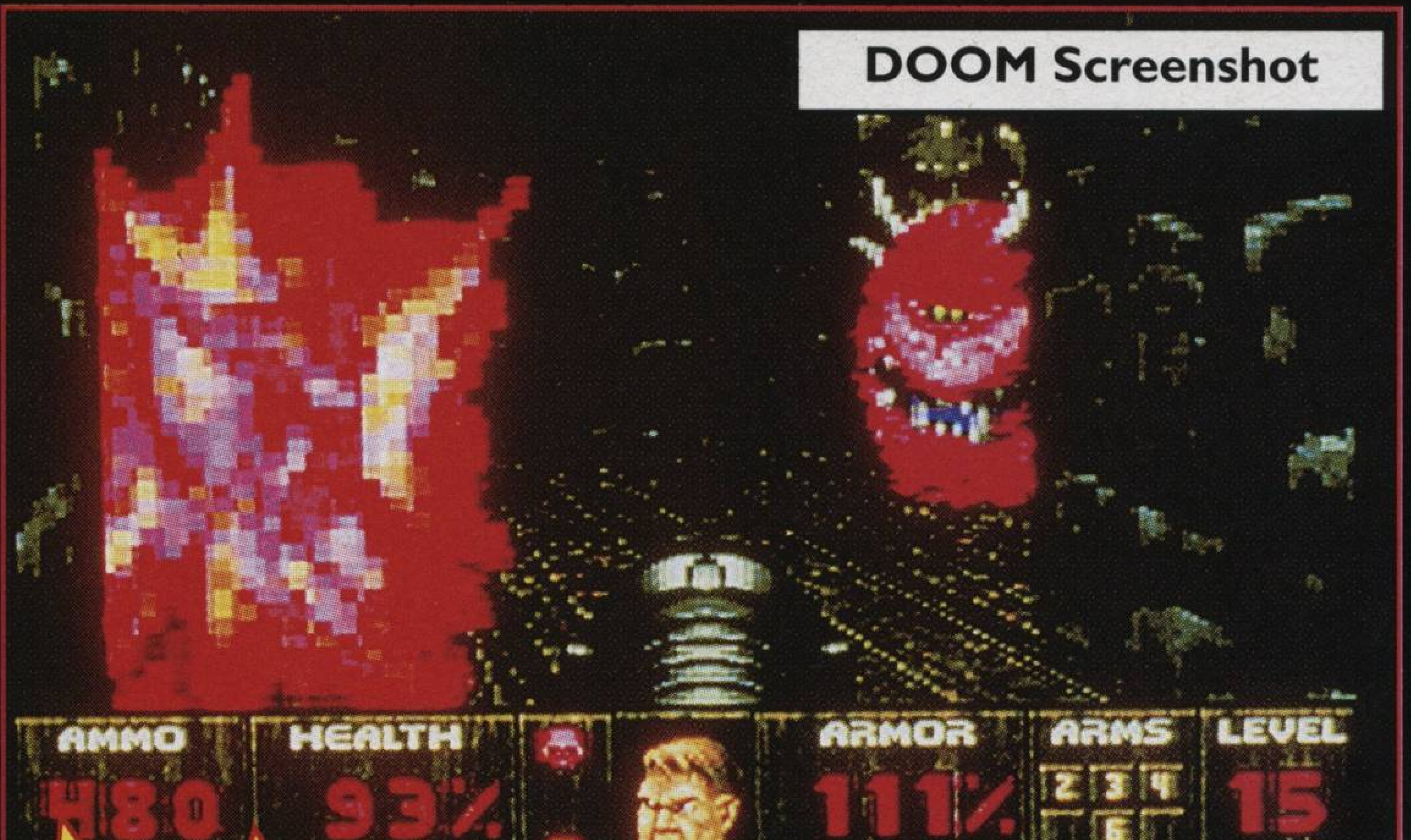

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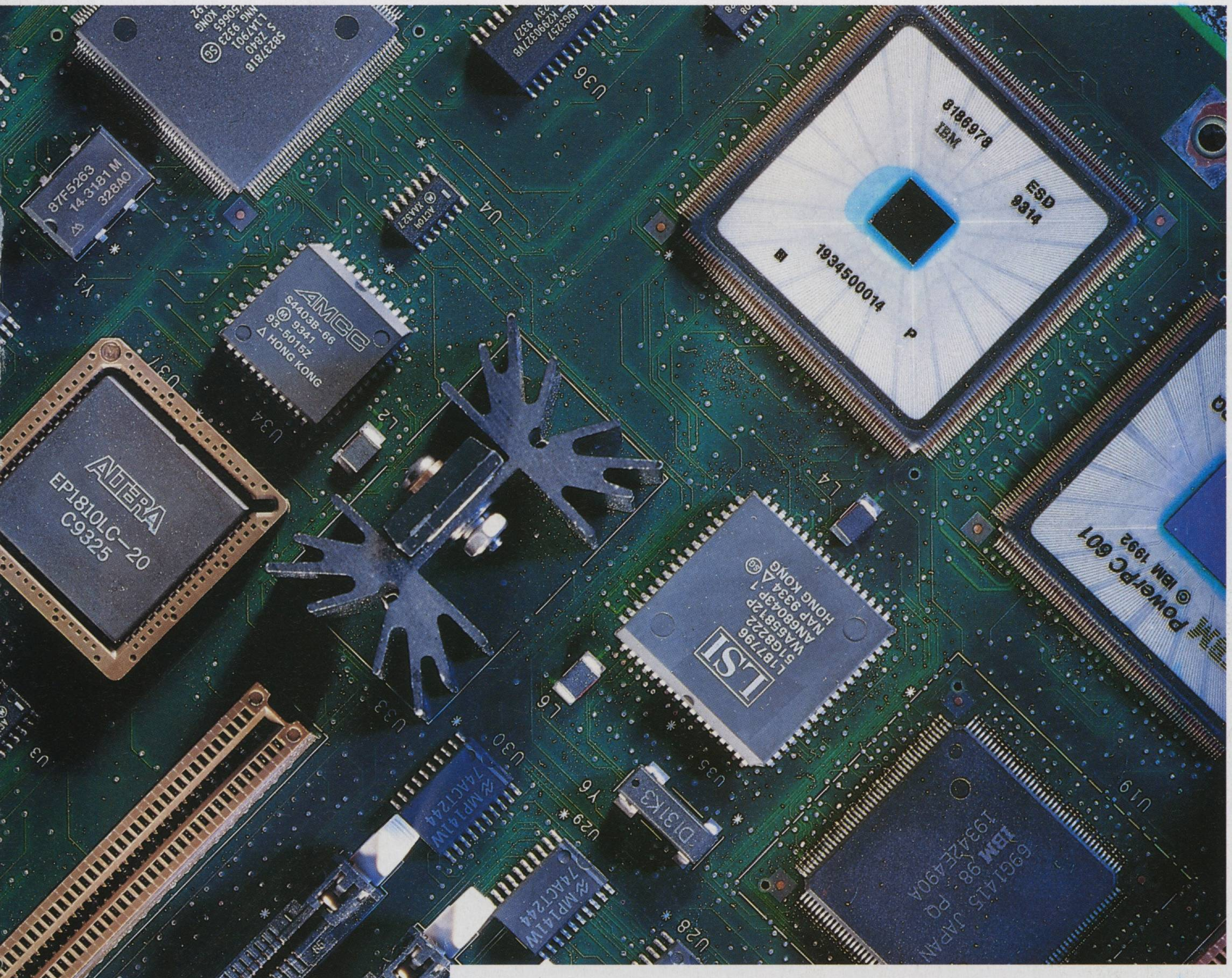

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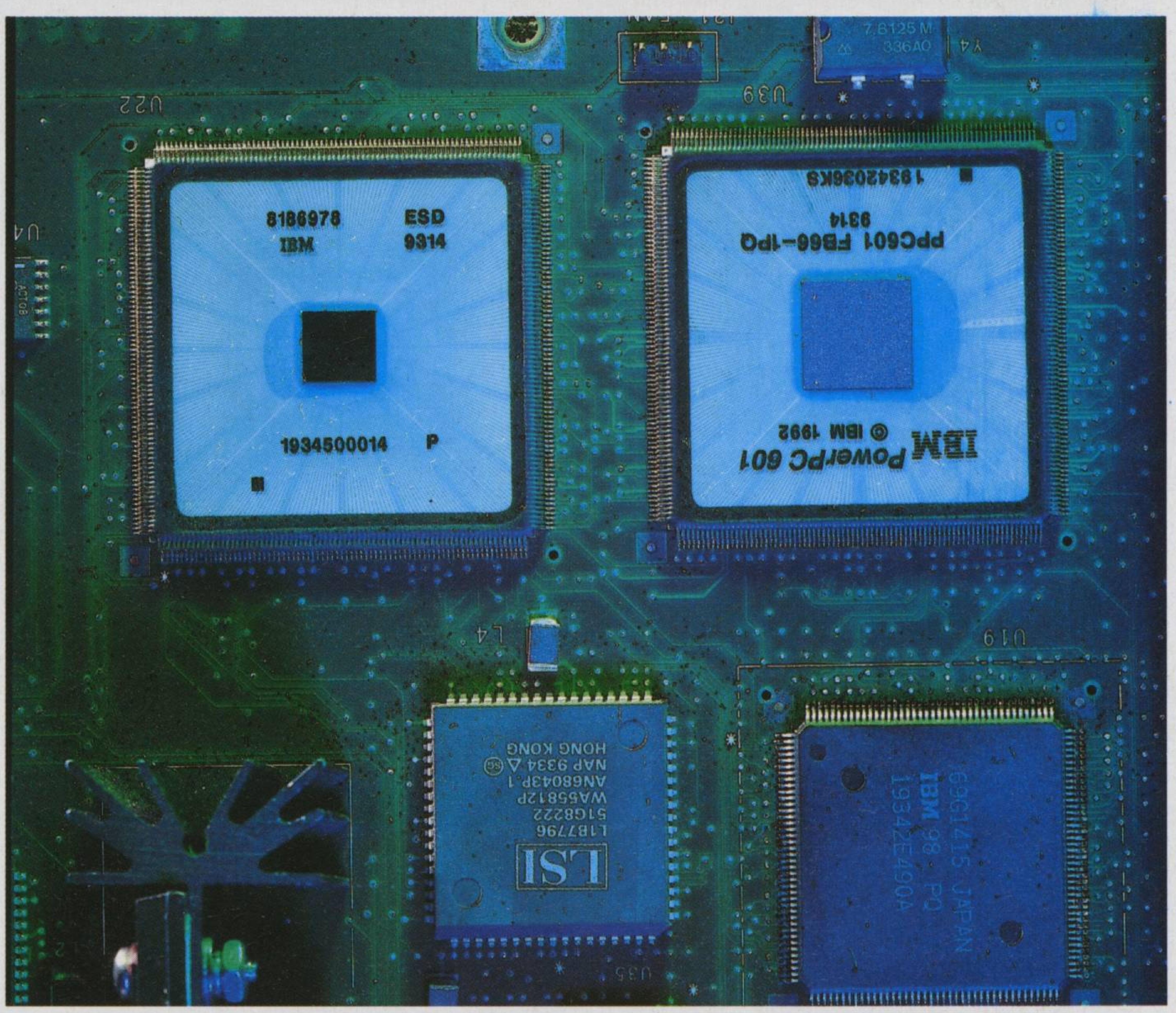

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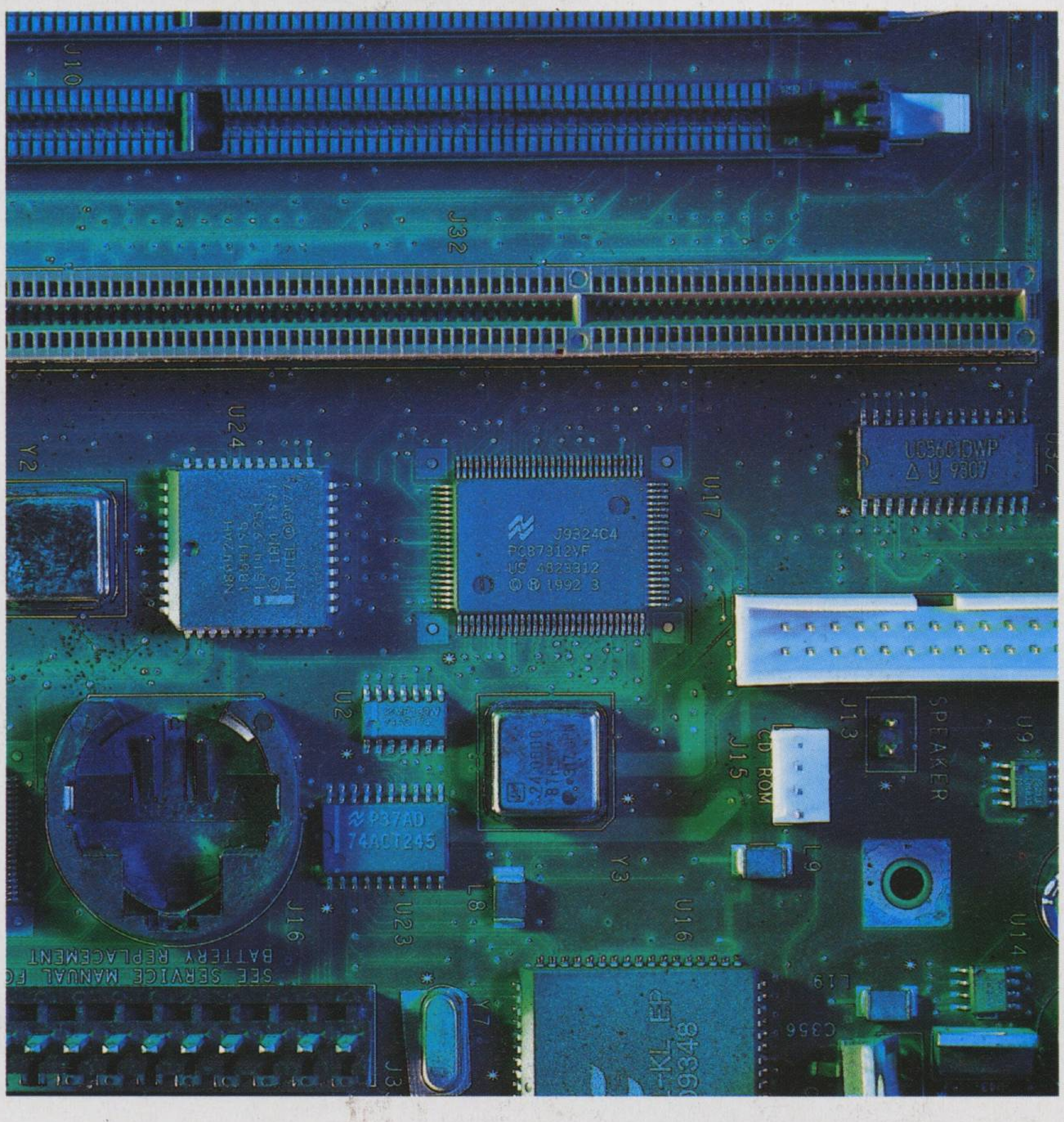


Edge looks at the emerging technologies which could make the next five years the heyday of the trusty PC

Despite its traditional image as the machine of business, the PC has now become a truly universal tool. Over the past few years it has broken out of the office to become the computer of choice for millions of home users. There are now pure leisure PCs which can run movies, show TV programmes, play hi-fi quality audio, support virtual reality and link to every major network in the world.

But this is only the beginning of a process that is set to transform the PC by

Continued next page

The **future** of the **PC**

Continued

the millennium. The machine continues to evolve and by the end of the century it could well have changed beyond recognition.

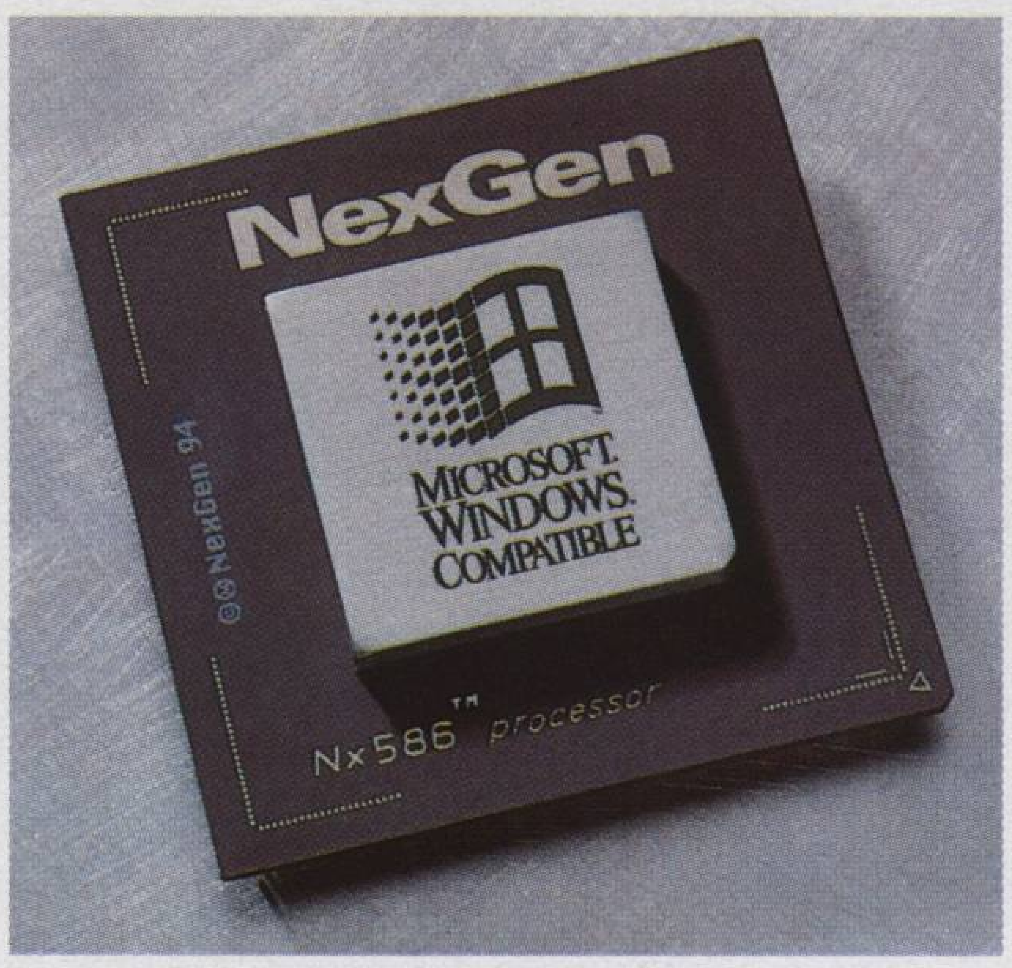
The principal catalyst in the evolution of the PC is its CPU. The original IBM PC XT, introduced in 1981, was based on an Intel 8088 chip which ran at a clock rate of 4.77MHz, a tiny fraction of the typical speeds seen today. 100MHz PCs are now becoming available, with 120MHz and 150MHz machines due in the next few months. Performance increases aren't tied directly to clock rate, however, as the 8bit data bus of the 8088 has also increased, to 16 bits and then 32 bits, and the internal processing has changed from 16 bits to the 64 bits of the Pentium chip.

A commonly used index of processor performance is the Landmark benchmark, which displays the throughput of a chip as the notional clock rate of an equivalent 80286 processor. The 80286 was the second in Intel's family of processors and was introduced in IBM's PC Advanced Technology (AT) machine in 1983, running at 6MHz. Current 90MHz Pentium machines produce Landmark indexes of around 520. In other words, they're running like 520MHz IBM PC ATs! So a current Pentium machine is around 85 times faster than a 6MHz PC AT, after around 14 years of development.

A current 90MHz Pentium machine is around 85 times faster than a 16MHz IBM PC AT, after around 14 years of development

Although the Pentium is regarded as the apogee of PC CPU technology, Intel isn't the only chipmaker contributing to the development of the PC. There are two main providers of rival processors to Intel: Cyrix and AMD. Both of these companies have grown up providing clones of Intel chips, either slightly faster or slightly cheaper. But both have broken away from adherence to the Intel standard with fresh designs for their latest processors. The K5 from AMD and the M1 from Cyrix are designed from the ground up to be code-compatible but are not copies of Intel designs. Cyrix claims that its M1 architecture is quite different from Intel's Pentium and should provide increased performance at a lower price. AMD's K5 chip has a different design again, but in turn claims similar performance improvements to the M1. So far, though, all this is on paper, as neither chip is yet available and the predicted performances are derived mainly from paper calculations or simulations.

This break with Intel is not only a good way of avoiding its aggressive litigation, but it also leaves both companies free to incorporate RISC structures into their chips. Despite the redesigns and extra efficiencies built into new Intel 486 and Pentium chips and the advantages they may have, they are essentially more complicated than the chips that went before. They use complex instruction sets – the really base-level operations that every chip has to be able to obey to run programs from games to spreadsheets. These Complex Instruction Set Computers (CISCs) use more transistors than the more recent Reduced Instruction Set (RISC) designs, for the same equivalent performance. The Pentium is Intel's most complex CISC design yet, with 3.1 million transistors compared to the 2.8 million of a RISC chip like the PowerPC 601. There is still room for further development of CISC chips and the potential for further clock rate increases – 120MHz and 150MHz Pentiums are already planned – but RISC technology is rapidly gaining in popularity.



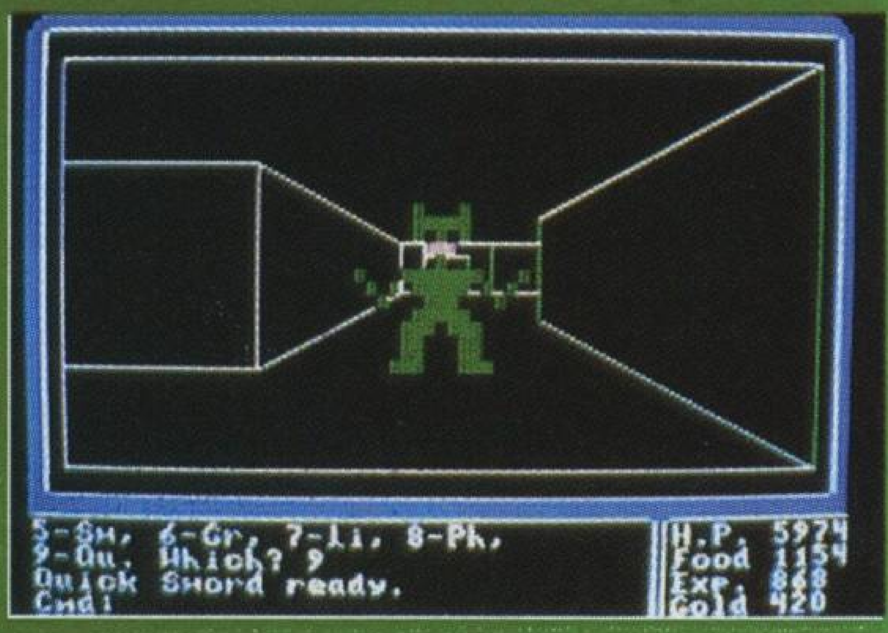
The NextGen Nx586 is one of the first of a new breed of RISC-based processors which can run Intel 80x86 code

CISCs take more power and tend to be harder to produce than RISCs, but the complex commands in application programs have to be broken down further in RISC machines, so there's a performance trade-off. And RISC designs need more cache to run efficiently, which keeps the transistor count up. However, most people agree that the way to continue increasing processor power without having chips that are too complex to build and too hot to use is to build RISC designs. Even Intel is said to be incorporating RISC elements into its forthcoming P6 follow-up to Pentium. Both architectures will be seen in PC design in the next couple of years and will open up the range of devices capable of running PC software.

NextGen, another company building Intel-compatible processors, has already incorporated RISC elements into its new Nx586 Pentium-class processor. The Nx586 runs at 84MHz but provides performance equivalent to a 90MHz Pentium. Peripherals, like videocards, soundcards, drives and memory, are the same as in a conventional PC; only the system board is different. There aren't huge advantages in either performance or price yet – a typical machine is around £100 cheaper – but that's partly because NextGen is still tiny compared to Intel. With increasing economies of scale, RISC-based PCs should become cheaper. If effective 80x86 emulation can be shown to

The **games**

Game: **Ultima**
Release date: **June 1992**
Developer: **Origin**
Minimum processor: **386SX-16**
Minimum video card RAM: **256K**



Ultima was one of the first seriously playable games for the PC, even though the four-colour vector graphics leave a lot to be desired by today's standards. The game was supplied on a single 5 1/4" disk and its minimum system requirements were undemanding: CGA graphics, DOS 2.1 or higher and a total of 256K RAM. Once upon a time, memory was easy to allocate...

The games

Game: **Ultima Underworld**
Release date: **June 1992**
Developer: **Origin**
Minimum processor: **386SX 16**
Minimum videocard RAM: **256K**

Origin's *Ultima Underworld* pushed the PC's graphics into a new era. Prior to the game, 3D movement was restricted to advancing in monotonous blocks (such as in *Eye Of The Beholder*). *Ultima Underworld* featured a true 3D world which allowed you total freedom to move around. The window was still fairly small but it gave PC users unprecedentedly realistic gameplay.

work, a variety of new processors may challenge the top-heavy Pentium architecture. Although RISC is not the saviour-of-computing-as-we-know-it that it once seemed, more companies are becoming interested in the technology.

Arguably the main threat to Intel's hegemony is the PowerPC RISC chip from the Motorola, IBM and Apple conglomerate. The original idea was that the RISC architecture would give machines built around it such a performance boost that they would be able to run both the Apple operating system (used in Macintoshes) and MS-DOS under software and eventually hardware emulation.

The Power Macintosh has sold strongly since its launch in spring 1994, and although there are some compatibility problems with non-native Mac applications, PowerPC-specific versions provide a solution. But MS-DOS emulation, which relies on a program called *SoftPC*, still only runs *Windows* in Real Mode, which has been abandoned on most current PCs.

However, there are new PowerPC processors well into development that will have the power to run these systems, as well as IBM's own Operating System 2. The PowerPC 604 is a high-performance processor running at 100MHz, as fast as any current chip from Intel. The 64bit PowerPC 620 will go further than that, with a core speed of 133MHz. It's the software development that's holding the hardware back at the moment, but we could still see RISC-based PCs capable of running a number of leading operating systems – and OS/2.

Increasingly, it's software that is driving the PC industry. Software demands more and more of the hardware and drives processors to higher speeds and machines to higher memory configurations. Although the huge range of software that keeps the PC so popular is still geared to Intel's 80x86 processors, it looks increasingly likely that software or firmware emulation of this code will enable the same software to run on a range of processor types. This will release the PC industry from the hold Intel has on it and allow new designs like RISC architectures, to be used in PCs for the first time.

One of the biggest advances that's likely to happen to the PC is *Windows 95*, the new version of Microsoft's leading operating system. The main criticism of the PC has always been its user-hostile interface, with a hieroglyphic prompt against which you have to type semi-meaningless abbreviations to get the machine to do anything helpful. The release of *Windows* was the beginning of the end of this niggle and the new version promises to take the machine into the uncharted territory of friendly computing.

But although the changes to the *Windows* interface are a great improvement, the most revolutionary aspect of the program is the way it changes the machine's memory map. *Windows 95* will be a full protected-mode operating system, which means that programs written specifically for it will no longer be restricted to a main memory block of 640K. If you have an 8Mb machine, then that 8Mb – or what remains of it once the operating system has taken its chunk – is available in one block. There should be no more struggling to fit powerful programs into 640K and no fiddling around with EMS memory managers.

Although this is also true of current *Windows* programs, most of these are serious applications. *Windows 95* will make available a much wider set of services to leisure and game programs, too. The use of *Win-G*, the games extension which is to be built into the new product, will allow many more games to run directly under *Windows*, without the need to slip back to MS-DOS and run their own protected-mode operating system.

Being able to write games which work with a common *Windows* interface will ease the compatibility problems which have plagued the PC. The PC has always been strong on standards. Unfortunately, it likes as many of them as possible. Although some things are getting better, there are new proposals virtually every month. *Windows* itself is imposing design standards simply by its weight of numbers. There are few people not designing software obeying *Windows* conventions these days, and these few will grow fewer.

Creative Labs has established a sound standard – SoundBlaster – which even Microsoft will be taking onboard with the release of *Windows 95*. The SVGA specification for video modes is also now well accepted. There are still several competing compression techniques for digital video, although the MPEG standard is gaining a lot of ground. The massive storage space afforded by CD-ROM is still restricted by the 640K segment DOS provides for running programs.

One development that will certainly make future PCs much easier to use is Plug 'n' Play. This is a standard designed to make setting up PC peripherals much easier. If everything works as planned you should be able to insert a Plug 'n' Play card into a Plug 'n' Play PC and expect it to work. Gone will be the endless trials with interrupts, DMA channels, base addresses

Despite being faster than the Pentium, the PowerPC RISC chip has failed to have any impact on the PC market so far

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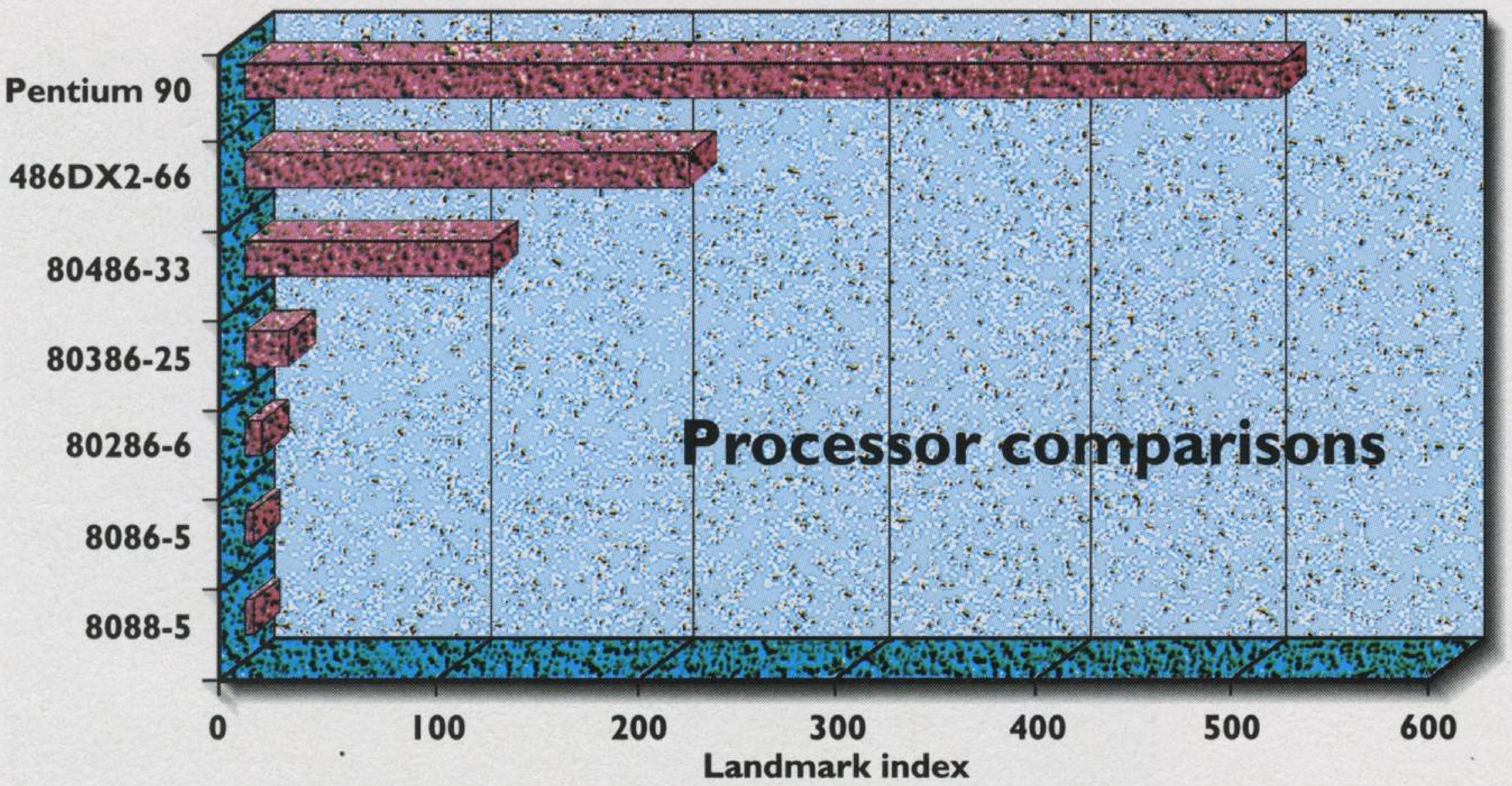
The **future** of the **PC**



If you were a mathematician, you might say that this chart was a pretty good example of an exponential growth rate. If you were Intel, you definitely would

Continued

etc with which PC users have hitherto had to contend.

A Plug 'n' Play PC will maintain a database of the cards and drives connected to it and their various requirements. It will be able to communicate with any new card and negotiate for interrupts, channels and addresses so that they don't clash with the requirements of any other device. Even existing cards will be able to take part, as long as their details are on the Plug 'n' Play database. Installation won't be automatic but it will still be a lot easier than now. Removing a card, perhaps for upgrading, will be automatically noticed by the Plug 'n' Play system and the interrupts made available to other devices.

To keep

pace with continuing developments in processors, we need chips with more and more memory. Already 4Mb memory modules (SIMMs) are becoming more common than 1Mb modules, with 8Mb and 16Mb units also starting to come onto the scene. 64Mb SIMMs have been announced but are currently extremely expensive. In fact, memory has not decreased in price by nearly as much as processors in the last three years. 1Mb of memory is still about £30 and the discount for buying 4Mb or 8Mb SIMMs is small.

This may change if Intel's research into flash technology proves fruitful. The company believes it has a way of storing several bits of information in the same flash memory cell. It does this by persuading the cell not just to be switched on (showing a voltage) or off (showing no voltage) but to hold a number of different voltages to represent one, two, three or four bits. If each memory cell can be made to hold several bits, the number of cells you need for a given memory capacity can be reduced. Intel has talked about prices of 30p a megabyte and machines with up to 1Gb of main memory.

This kind

of cheap extra memory will remove one of the problems facing another emerging PC technology: voice recognition. The one aspect of Star Trek technology that is certain to appear before the 23rd century is the ability of computers to recognise verbal commands. Novell WordPerfect, IBM and a number of other big names are known to be working on voice input for application programs and the first examples are promised this year.

There are two levels of voice recognition: command level and natural language. Command level can recognise individual words or phrases spoken discreetly, such as 'File, Print, Copies, Two, OK' to print two copies of a document under *Windows*. This is comparatively easy, as the software is only required to match the envelope of the sound to an entry in its database. This kind of control is already available in programs like Creative's *VoiceAssist*, but the interesting developments will come with natural language recognition.

Early natural language programs should be able to understand 'Print two copies of the current document', spoken without unnatural gaps between words. As the technology improves, it should be possible to build context recognition into the process, so that a command like 'Show the performance results for the Pentium-90 and the NextGen Nx586 in the worksheet "Tests" and create a new column of their differences' is understood. We're still some way away from this level of understanding, but it will make a radical difference to the way PCs are used.

CD-ROM drives

are becoming standard-issue on modern PCs, and not just for multimedia machines. The CD-ROM is so cheap to produce, so hard to pirate and has such a large capacity – relative to floppies – that it is the ideal medium for distributing software. To be able to abandon boxes full of floppies, though, the majority of PCs have to be fitted with CD-ROM drives. This will happen in the next year or two and several other changes to the drives themselves will further establish the technology.

The data transfer rate of a double-speed CD-ROM drive is around a quarter of that of a hard disk, and even lower compared to some of the new enhanced IDE and SCSI disk drives. Quad-speed CD-ROM drives are dropping in price but are still more than £300 a unit. However, new technology is on the way from Pioneer that could transform CD-ROM. Pioneer has found a way of

The games

Game: **Wolfenstein 3D**
Release date: **June 1992**
Developer: **id Software**
Minimum processor: **286SX**
Minimum videocard RAM: **512K**

When *Wolfenstein 3D* appeared it was the fastest 3D game ever. Id Software had developed a new engine that enabled even lowly-specced PCs to shift a Nazi castle around at high speed. The game 'cheated' in that it did not manipulate a true 3D environment (looking up and down was not possible) but a full window display was possible and *Wolfenstein* took its place in the PC hall of fame.

creating a blue-light laser which works at room temperature. The advantage of blue light is that its wavelength is much shorter than today's red beams. With a shorter wavelength, the laser beam has a smaller 'point'. This means that you can read smaller pits in a CD's surface and put more of them on any area of the disc. In fact, Pioneer estimates that it will be able to store three or four times as much digital video – complete feature films on one disc – or up to 10 hours of ultra high-quality sound. It will be a couple of years before this technology is ready, but in the meantime there's high-density CD.

HDCD is set to double the video storage of a single disc, using a new kind of routine – MPEG 2 – that compresses different frames by different amounts. Depending on the changes that have occurred between the previous and current frames, a frame may take between 1Mbit and 8Mbits, and that's compressing every line of the picture. This contrasts with the current MPEG 1 convention, which compresses every frame to the same size and uses only every other line.

CD-ROM won't really have arrived until you can record data on them. Until recently, drives that could write a CD-ROM, using a higher-powered laser than is needed to read them, cost well into four figures. This will change, as suitable drives are already dropping in price and will cost under $800 in the US this year. Within a couple of years they may well be an affordable part of the family multimedia centre.

The PC has always been strong on standards – it likes as many of them as possible

This kind of CD-ROM storage is only suitable for one-off recordings, when editing isn't necessary. Currently, CD-ROM is a write-once medium and although there are multi-write optical technologies available, the discs are too expensive for general-purpose use.

Another technology which looks promising is the high-density floppy disk proposed by Fuji. Fuji has formulated a microthin magnetic coating for videotapes which allows extremely high data densities. This same coating could be used for floppy disks. With the disks spinning at around ten times their current speed, both the transfer rate and capacity could be increased. Fuji believes it can make 3.5-inch floppy disks with a capacity of up to 200Mb.

The only problem is that the company doesn't make floppy disk drives. Although it's quite capable of churning out the disks, it has to persuade someone else that it's a good idea to make drives for them. Assuming it can cross this hurdle, cheap, high-capacity floppies could well be available in bulk within a year.

The games

Game: **Doom**
Release date: **November 1993**
Developer: **id Software**
Minimum processor: **386SX**
Minimum videocard RAM: **1Mb**

The most talked-about PC game ever – and with good reason. Running on a 486 machine (essential for maximum effect), *Doom* took PC graphics to a totally new level of speed, detail and realism, and provided a genuinely scary degree of immersion in the gameworld. *Wolfenstein* became obsolete overnight, strategy addicts (for a while at least) deserted their favourites, and only the most pedantic quibbled about the fact that it was still not true 3D.

Increased storage capacity is essential to cope with the huge amount of data generated by virtual reality applications. Virtual reality is not a technology exclusive to the PC, but the strength of the PC's userbase makes it one of the most lucrative markets for affordable VR headsets and body suits. We already have headsets such as the Cybermaxx, which costs less than £500 and uses miniature active-matrix LCD screens and wide fields of view. Though there's little software to support the systems so far, the pricing and likely market size should encourage enough companies to keep the titles rolling out. VR gloves and body suits are also in the pipeline, making fully immersive experiences a possibility in the home for the first time.

The miniature VR screens in these headsets could also be used to display TV pictures. With the correct encoding, limited 3D effects could be obtained from standard transmitted signals. The limiting factor at the moment is the resolution of the LCD panels themselves.

Embedded TV pictures are already available on *Windows* screens, using a chipset developed by Philips. The chips take a standard RF signal from any TV aerial and convert it to display on a PC screen, where it can be sized and moved around within a window like any other *Windows* application. It isn't a true digitised picture, though. The signal is still analogue – you can grab individual frames and digitise them, but you can't record extracts for realtime playback. With the improvements in MPEG compression techniques, this won't be long in coming, though. High-priced digital TV cards are beginning to dribble out of the US and these will enable digitising of pictures off-air and digital recording of the results on suitable media.

The huge growth in electronic mail and networking systems, epitomised by the Internet, is already starting to tie computers of all persuasions together into global communities. Although these systems are still not intuitive enough for mass use, new interfaces are under development and PCs will be at the forefront of machines making the connections. Internet access is already built into *OS/2 Warp* and *Windows 95*, and Microsoft recently launched its own rival to online services such as CompuServe. Microsoft's offering is aimed very much at homes users and will major on an easy-to-use *Windows* interface.

In business, PCs are being used for video conferencing, the kind of person-to-person, full-motion video calls previously the realm of Captain Scarlet and expensive standalone BT devices. The growing availability of digital ISDN telephone lines will permit cheaper PC-based connections of this type, once the wiring is there to take them. The latest version of *Corel Ventura Publisher*, the high-end DTP program, was co-developed by

Continued next page

Continued

The **future** of the **PC**

programming teams in Canada, England, India and the US, all working on the same code on a single network.

Soundcards continue to improve in quality and facilities, with devices such as Creative's AWE 32 now boasting 32bit processors. The more interesting aspect of this card, though, is the wave-table synthesis it uses to reproduce natural sound, including acoustic instruments. Rather than synthesising the sounds as earlier cards did, the AWE and other modern cards use tables of their waveforms. This produces much more accurate copies of the originals and these can then be used as MIDI voices in conjunction with the new generation of PC-based music software.

The PC's weight of numbers ensures its success as the mainstream desktop computer for at least the next 10 years

The other approach to sound, increasingly used in business PCs, is the digital signal processor, or DSP. These versatile chips can be reconfigured through software to perform several functions, often at the same time. Typical DSPs can be used as fax/modems, voicemail systems, CD-ROM controllers and soundcards. This is a very efficient way of working, as the chips take up little room on the system boards or expansions cards within PCs.

The size and shape of a PC is governed by the components it has to contain, and unless they change, this shape is fairly fixed. There have been a number of attempts to make the machine smaller, but this then limits the number of drives and expansion cards you can add. The flexibility of the PC has always been one of the key factors in its popularity.

As more and more PCs are sold into homes, there are moves to integrate the monitor and system unit and to build in multimedia speakers and microphones. This makes the setting up easier too, as there are fewer cables to connect.

A more radical solution, yet to be seen but a distinct possibility, is to use the PC cards already available in notebook machines, instead of the standard expansion bus. Normal expansion boards are much bigger than the credit-card-sized PCMCIA cards. Imagine a PC with half a dozen PC card slots in its front panel. No need to remove the case to upgrade – even to add a new hard drive – and you've got the ability to change the machine's configuration, even when it's powered up. A PC based on PC cards wouldn't need to be much taller than the card itself and, with a separate keyboard, could have a footprint smaller than many notebooks.

The PC is being turned to so many different tasks that it is really becoming a vehicle for advances in many areas of communications and IT. Its sheer weight of numbers ensures its success as the mainstream desktop computer for at least the next 10 years. Although virtually all elements of the machine will change during that time, the commitment of hardware and software companies to backwards compatibility means that the PC is one of the few viable massmarket microcomputers.

So what kind of PCs can we expect to see by the end of the century? Speech recognition will undoubtedly feature heavily in the PC of five years hence. Conversations like, 'Computer, record this week's Drop the Dead Donkey over last week's Star Trek Voyager, edit out the ad break and close up any subsequent recordings on that disc' are not that far from reality. By the end of the century, or more probably before, it may be second nature. Speech recognition will be built into new versions of major applications like the word processor *WordPerfect* before the end of this year. Although it will be more faltering than the example above, there's a lot of money being poured into natural speech understanding. Part of the problem is processing power. However, the rate of increase in processing power shows no signs of slowing, and a hybrid of existing and new technologies which will ensure that the PC of 2000 is much faster than the machines of today.

In the near future, recording TV or other forms of video on CDs or CD-sized discs will be an easy matter, and advanced compression techniques, combined with the higher packing densities offered by high-frequency lasers, will permit easy video editing and home recording on disc. Writable CDs in some form will also be cheaply available.

PC 2000 will still have a screen, probably a TrueColour LCD since there is no other technology on the horizon which is as light and compact. Touch sensitivity may well be included, to augment voice control and the occasional use of a keyboard, where this is more efficient. Transparent connection to a variety of Internet-like services will be automatic, as and when the information searches we request need to make use of them. The main link will either be high-speed telephone fibre optic or satellite dish.

If you want the result of your work on paper, you'll print in full colour on a desktop printer with a commercial print resolution of 2000 dpi or above. Games may well include full VR bodysuits and environments will be photorealistic, with none of the blocky effects seen on today's headsets. Finally, the desktop machine is likely to be a lot smaller than current PCs, possibly based on the PCMCIA standard.

And people used to think the PC was boring…

The games

Game: **Magic Carpet**
Release date: **November 1994**
Developer: **Bullfrog**
Minimum processor: **486**
Minimum videocard RAM: **1Mb**

The finest graphics on the PC to date belong to *Magic Carpet*. Rather than set off on a futile attempt to copy id's *Doom* engine, Bullfrog instead persevered with its revolutionary fractal engine technology. The first game to feature a dedicated Pentium mode (SVGA throughout), *Magic Carpet* grants the player complete freedom to explore. Cliffs melt seamlessly into the sea while fireballs explode all around you… This really is something special.

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PANZER DRAGOON (SATURN)
RPG (PLAY STATION)
VIRTUA FIGHTERS (SATURN)
RAD MOBILE (SATURN)
DAYTONA USA (SATURN)
HAUNTED MANSION (SATURN)
TOLLY POLLY CIRCUS GP (PLAY STATION)
TAIL OF THE GODS COMBAT (PLAY STATION)
RIDGE RACER (PLAY STATION)
LET THE GOOD TIMES ROLL
PREPARE FOR A QUANTUM LEAP IN VIDEO GAMING TECHNOLOGY - THE SONY PLAY STATION AND SEGA SATURN ARE ON THEIR WAY - AND WILL BE AVAILABLE FROM ZAP COMPUTER GAMES THIS XMAS - CONTACT OUR HOTLINE NOW TO RESERVE YOUR MACHINE & SOFTWARE.
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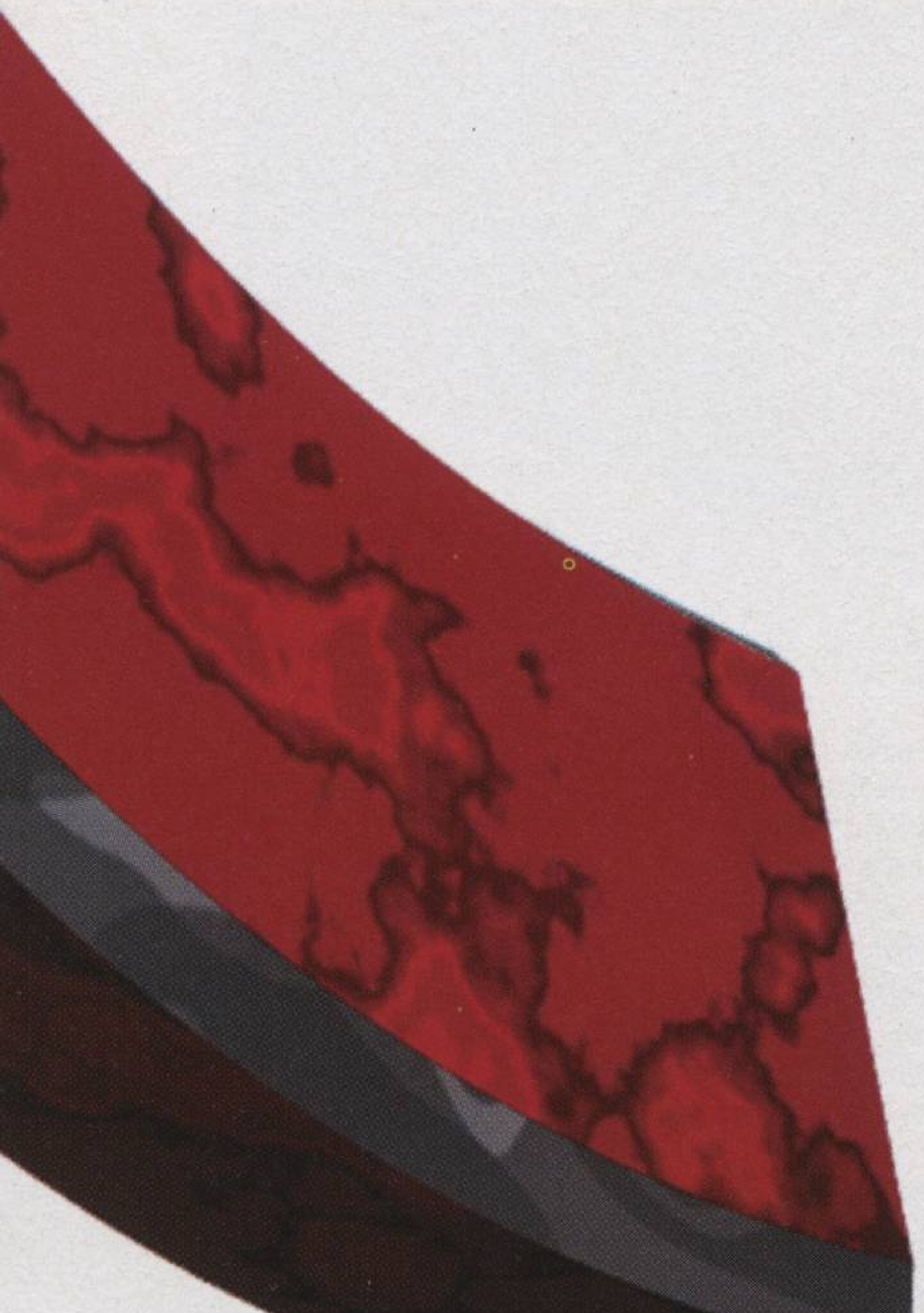
EDGE magazine March 1995

Atari: from boom to bust and back again

The oldest videogames company of them all once held an entire industry in its grasp. And then it threw it all away. So why is Atari now back in the running?



The dominant position of Japanese consoles in today's videogames market makes it easy to forget that the original market leader in home video consoles was an American company.

Atari arrived on the scene 15 years. ago. Given that at the beginning it had a clear field, you would have thought that it would still be a major force. Not so. Atari is a company that still exists almost despite itself. During the 1970s it was the equivalent of Nintendo, conquering the world with its VCS 2600 console. Somewhere along the line, though, it lost the plot. Thanks to some disastrous marketing decisions, the company changed hands, moved from console to computer development, made plenty of money off the back of the ST range and then lost millions fighting Commodore. Now it has re-entered the console market with its 64bit Jaguar machine, has been involved in a

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Atari

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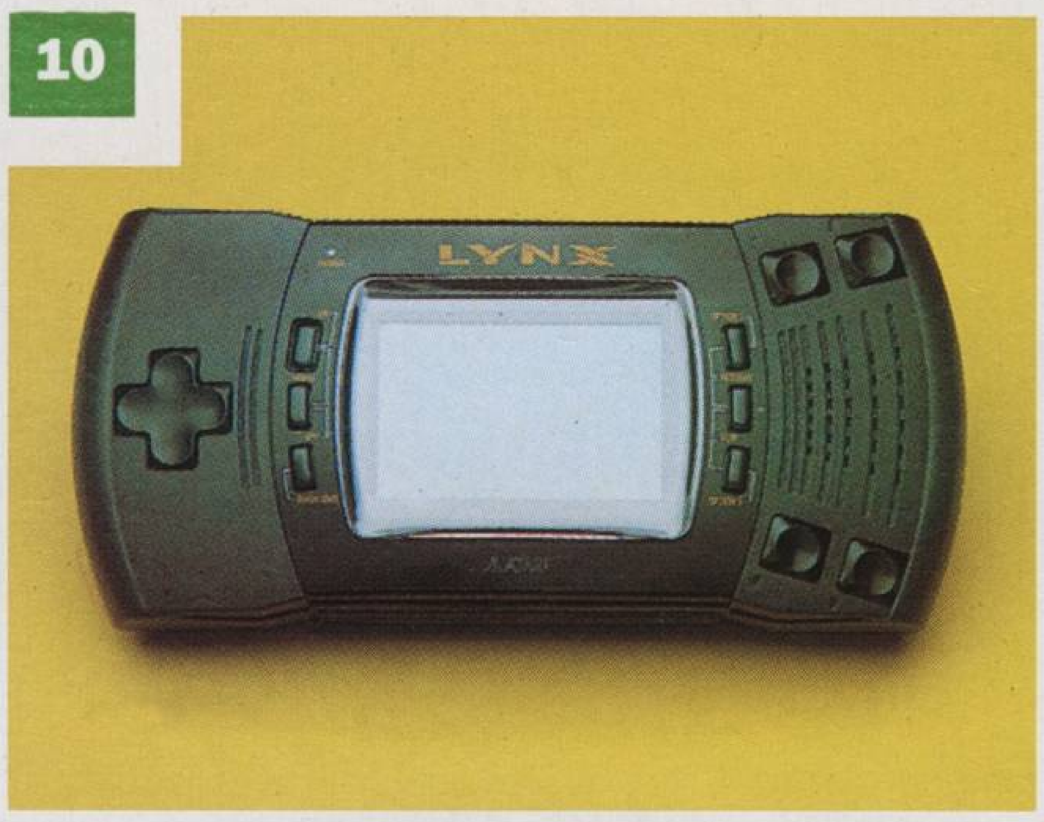

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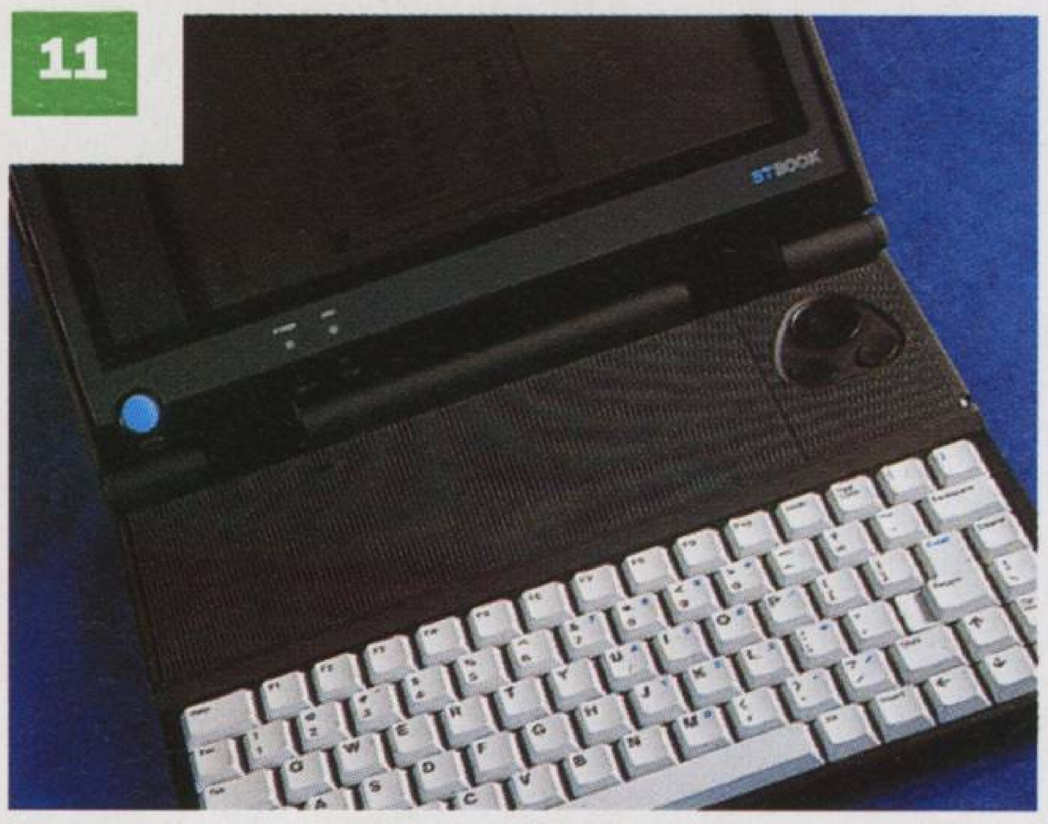

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Atari hardware: 1 The VCS, Atari's first venture into home entertainment. 2 The 7800, released at about the same time the bubble burst. 3 The 800XL, second in Atari's first range of home computers. 4 The first real ST, the STFM. 5 Its successor, the STE, featuring a blitter. 6 The STacey, a portable machine devoted to music applications. 7 The Mega STE, featuring 1Mb of memory (and a pretty box). 8 The TT, which made a break with the regular ST but was still compatible with it. 9 The Falcon, which, among other enhancements, brought 32bit TrueColour to our screens. 10 The Lynx, a handheld colour cart-driven gaming diversion. 11 The STBook, marketed simply as a portable ST. 12 The STPad, Atari's ill-fated handwriting-recognition tool 13 The latest machine, the Jaguar

A very interesting court case with Sega and has decided to settle some old scores.

The list of Atari alumni is like a who's who of the computer and console industry. So many leading industry figures have been involved in the firm at one stage or another that a history of the company reads like a history of videogames themselves.

Atari was founded in 1968 by a University Of California engineering graduate called Nolan Bushnell. He had become interested in computer games during his time at college, where he played one of the very first, a primitive creation called *Space War*. So taken was he by this game that he decided to produce a version for himself, and so the very first arcade game, *Computer War*, was born. He took the design to a pinball company, which manufactured it. It bombed, big time.

Unperturbed, Bushnell decided to produce a simpler product. After some thought, he designed an uncomplicated tennis game which he called *Pong*. He built a prototype and, in 1972, after a successful trial of the machine, set up his own production line. Having scraped some cash together from friends, relatives and the bank, he employed a group of techno-hippies (Steve Jobs and Steve Wozniak of Apple fame among them), who fought to keep up with demand.

In those early days, Atari was breaking new ground. It released the first car racing game, called *Gran Trak*, and the first tank game, named (somewhat obscurely) *Tank*, which was also the first arcade game to store its graphics data on ROM. Shortly after the success of these machines, Atari released *Breakout*, a game that still gets released on new formats today.

By 1973, the company had 80 employees and Bushnell was looking for ways to fund new growth. He'd seen the potential that videogames had, but the company lacked the finances to exploit it. As a result, he sold the rights to *Pong* to Bally, the pinball company, which went on to sell thousands more units all over the world. With this cash injection the Atari engineers created *Sprint*, the first arcade machine to use a CPU to control the game.

What Bushnell really wanted, though, was a machine that could be used at home. He realised that although arcade games would always be popular, there was a massive domestic market just waiting to be tapped. It was with this in mind that he created the Atari VCS 2600 console. Its compact design, custom chips and sophisticated sound and graphics made it an instant hit when it was released in 1976 – the same people who played Atari games in the arcades could, for the first time, play them at home as well.

Around 1976, however, things started going wrong at Atari. The company had overstretched itself, particularly with the development of the Atari 800 computer, and so Bushnell sold the company to the huge media conglomerate Time Warner for over 20 million dollars. He couldn't let go completely, though, and remained with the firm as chairman.

At that time Atari adopted an attitude which was to be copied in the late '80s by the Japanese console companies. The only competitor to the Atari 800 was the Apple II that Jobs and Wozniak had created in their garage. While the Apple was an 'open' system, Atari threatened to sue anyone who developed software for its machine, because it figured, correctly, that revenue came from software and not hardware sales. So although groundbreaking products like *Visi-Calc* (the very first spreadsheet) were being created for the Apple, the Atari 800 suffered from a dearth of software.

Atari acolyte Jeff Minter is possibly the strongest ally the Jaguar has. Its success will be due in no small part to his efforts

In 1978, after an acrimonious dispute with Time Warner, Bushnell left Atari with a healthy golden handshake. After the dust settled, the company forged ahead with sales of its VCS and (for a while) it was unbeatable. By 1981 over 20 million consoles had been sold and the arcade market had grown in just eight years to a value of six billion dollars. Anyone with a stake in such a lucrative market could be forgiven for becoming complacent.

In those early days, everyone believed that the console market was untouchable. It had emerged from absolutely nowhere to become the single largest component of the toy sector. All the traditional toy companies had

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'They **failed** because they thought their competition was Commodore, when it was actually **Nintendo** and **Sega**'

Peter Molyneux, Bullfrog

'If Nintendo and Sega are **East 17** and **Take That** respectively, then we're the **Rolling Stones.** We might be the oldest kids on the block, but we're still **rocking**'

Darryl Still, Atari UK

'There are too many machines in the marketplace. **Full stop**'

Jon Hare, Sensible Software

Atari

A scrambled to jump onboard, providing plenty of rivals for Atari. But what happened next had more to do with poor planning than the amount of competition in the field.

In 1983, the console market had reached saturation point. Everyone who wanted a home videogame system had bought one, and yet companies like Atari carried on churning out units. At one point, it was even producing more games cartridges than there were machines to play them on. It assumed that all it had to do was release the games and the public would snap them up. But as many companies have discovered, public taste can't be taken for granted.

Every market has to keep the customer interested. Car companies release a range of models at a variety of prices. The music industry constantly offers up new talent for public consumption to keep the market moving. In its naivety and arrogance, the American videogames industry ignored these hard-learned lessons and in late 1983 the videogames market suffered a disastrous slump.

It was at this time in 1983 that Atari made a judgement that probably still gives executives nightmares. It was approached by a Japanese designer from a then little-known company called Nintendo and offered the worldwide rights to the Famicom console. Hiroshi Yamauchi figured that because Atari already had a worldwide distribution network, it would be the perfect company to set up a global release for his machine. In its wisdom, Atari blew the Japanese company out, and so Nintendo set about the task of worldwide domination on its own.

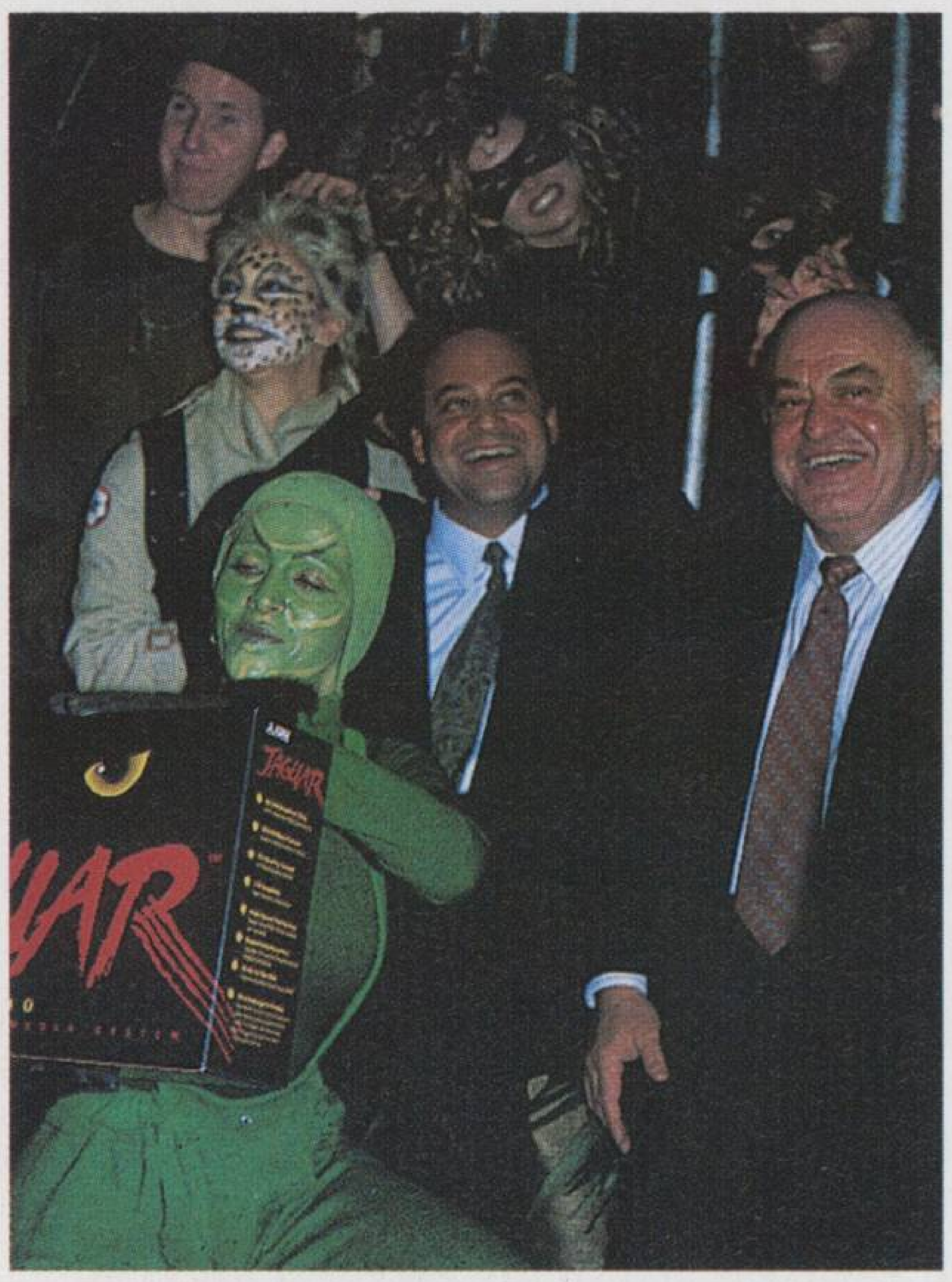
In that year Atari made a loss of $536 million. Time Warner couldn't cope with such a massive drain on its funds and scrambled to sell as quickly as it could. The computer and videogames divisions were sold to Jack Tramiel, the man who had been ousted from Commodore, the company he founded. The coin-op division, Atari Games, was sold to Masaya Nakamara at Namco. Time Warner was reluctant to burn its bridges, though, and cleverly hung on to a 25% stake in Atari and a 40% stake in Atari Games. While Tramiel plotted to beat Apple and Commodore at their own game, Nintendo was hatching plans to rekindle the console market with the help of a plumber.

The 2600 was still the only console that counted when the Tramiels bought Atari. All they had to do was come up with a replacement for the ageing machine and some decent software to play on it. At this stage they must have known that the 800 stood no chance against the Apple and the IBM PC. This is undoubtedly the point at which Sam Tramiel (the newly appointed president) told his engineers to come up with a completely new machine.

Atari released follow-ups to the 2600, in the form of the 7000 series, but these bombed in the face of the new Nintendo machine. Atari wasn't at all happy with the success of Nintendo; it didn't like the way that Nintendo had a stranglehold on who produced cartridges for its system and launched a lawsuit against the company alleging that the practice violated American antitrust laws.

By 1986 Atari had designed its first 16bit computer, the ST. Everyone immediately thought that 'ST' stood for Sam Tramiel, but he insists that it's an acronym for Sixteen Thirty-Two (the system's internal architecture). The first machine had 256K of RAM, an external 3.5" drive and a brand-new 'desktop' navigated using a mouse. It was released about a year before the Commodore Amiga, the machine that proved to be the ST's bitter rival. The irony was that Atari invested startup capital in the Amiga when it was still a pipedream, but when it was offered the machine it turned it down in favour of its own ST.

Initially lots of publishers released products for the ST. Atari authorised



Two generations of the Tramiel family have directed the fate of Atari. Sam (left) and his father Jack, all smiles at the Jaguar launch

'I think that Atari's only real **aspiration** can only be to stay in the game, and though they wouldn't **admit it,** even the management know that. If they could earn a half decent market share the Tramiel family would be dancing a **jig** come Christmas 1995'

Stuart Dinsey, CTW

'That's **true** up to a point, in that our immediate **ambition** is to be seen to be part of the game. But we eventually aim to be number **two or three'**

Bob Gleadow Vice President Atari Europe

conversions of its popular arcade games, and with titles like *Sprint* and *Gauntlet* behind it, sales were buoyant. At this stage, Atari must have figured that the Amiga would never touch it. Although it was technically superior, it was much more expensive and was being marketed as a business machine. In 1989, Atari launched the 520 ST, with an internal 3.5" floppy disk drive, 520K of RAM and a midi port. STs walked off the shelves.

By 1989, thanks mainly to the release of the A500 for the home market, the public was becoming aware that the Amiga was an exceptionally powerful machine. Games like *Defender Of The Crown* were left running in shops, and punters were amazed at the sampled sounds. But still the ST kept the lead. Its head start meant that it had the largest range of software, and it still cost less than the Amiga. But by 1990 the remodelled Amiga 500, rather than the ST, was becoming the 'must have' machine.

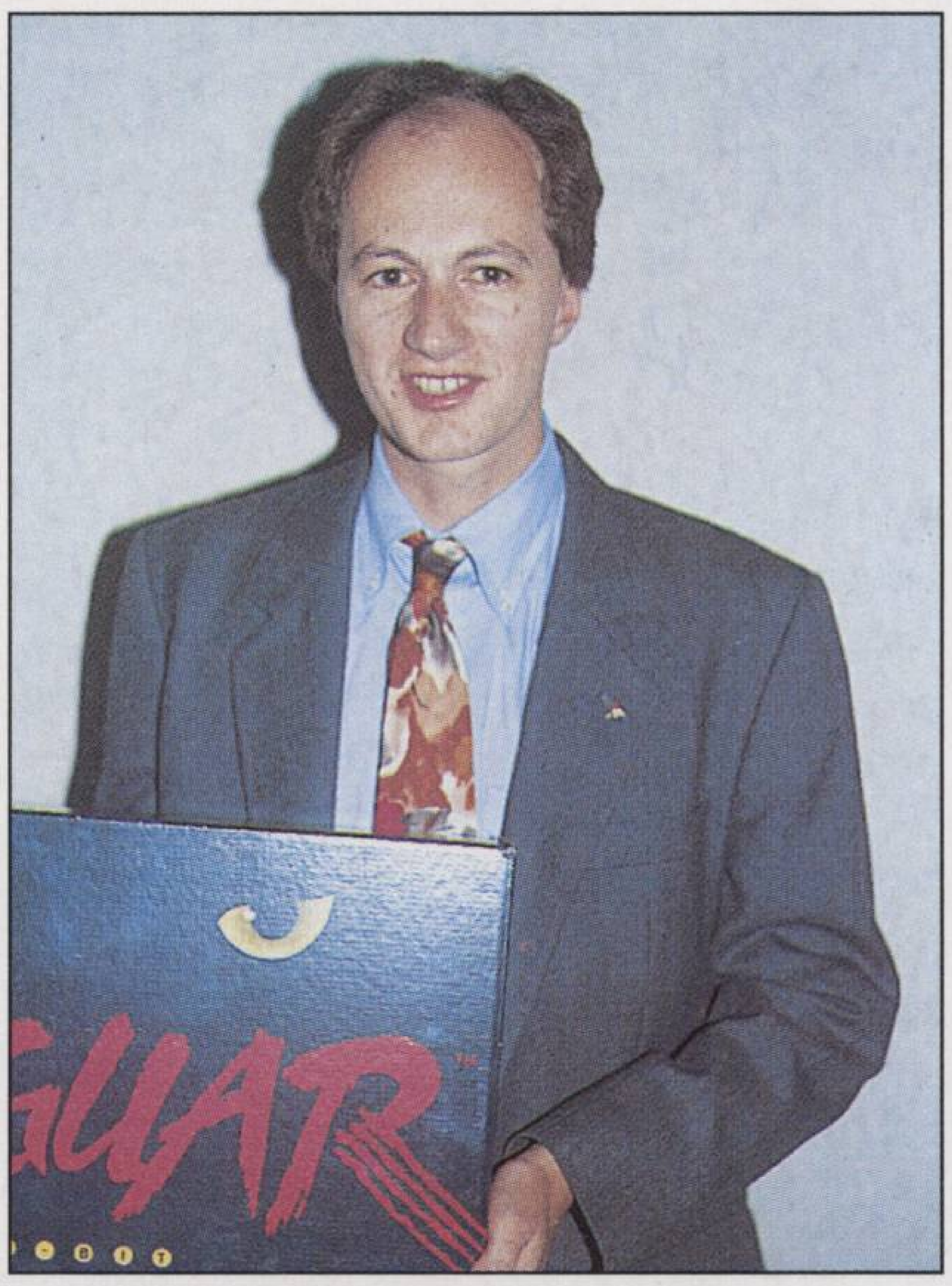
Home computers had now become the most popular games medium in Europe. Although consoles were strong in America (the Famicom that Atari could have owned was renamed the Nintendo Entertainment System and launched worldwide, and Sega introduced its Master System), the Europeans bought more and more home computers, particularly the ST. In 1990 the British market was split down the middle between the Amiga and the ST – nobody wanted a console.

In 1991 the Amiga started outselling the ST. The software houses were quick to switch allegiance. Games started appearing on the Amiga first and the ST second. This was despite the release of the STe, an upgraded Atari machine featuring a 4096-colour palette. The extra 'e' didn't fool anyone, though: the ST range still couldn't touch the Amiga's technical specifications.

It was in early 1992 that rumours of a new system, the Falcon, emerged. By this time the Amiga was way ahead of the ST range in terms of both software and value for money, so loyal Atari owners hoped that the new machine would give Commodore a bloody nose. It wasn't to be. The Falcon was launched in autumn '92 but wasn't released in any volume until '93. After taking a deep breath, the computer-buying public decided to stick with the Amiga. The Falcon sold, but in relatively paltry numbers and mainly to 'hobbyists'. Meanwhile, the well-oiled Atari rumour factory churned out a singularly unbelievable nugget: there was a 64bit console on the way. That year Atari Corporation posted losses of $76.3 million.

Where America goes, Europe tends to follow. The 8bit Nintendo and Sega consoles had been doing exceptionally brisk business in the US during the late '80s, and by 1991 the Super Famicom and Master System were big news. The 16bit console market exploded in 1991, and the shockwaves reverberated through Europe.

At this point Atari started developing its own console. It had been beaten by Commodore in the home computer market and so it made sense for it to return to a marketplace it knew well. In 1992 the new 16bit consoles went global, turning Nintendo and Sega into fabulously profitable companies with the financial clout to crush anyone who threatened their dominance. Although the Falcon continued to sell in minimal amounts (through specialist computer shops), Atari's handheld Lynx bombed, despite being the most powerful machine on the market.



Richard Miller, vice president of engineering at Atari US, was instrumental in developing the Jaguar's 64bit technology

By 1993, the popularity of the ST and Falcon had crumbled almost completely. Atari was now on the ropes. Its machines had zero credibility and it was losing money hand over fist. Things could only get better.

Atari unveiled the Jaguar in August 1993 at the Chicago Consumer Entertainment Show, to general acclaim. 150 developers were sufficiently impressed to sign up for production rights by the end of 1993. Richard Miller, Atari's English technical wizard, had invented a brilliant chipset that was capable of chucking

Continued next page

'We are extremely **pleased** with this relationship which has potential longterm **benefits** for both companies'

David Rosen, Sega Of America

'We at Atari are very **pleased** with this new affiliation. The increased **cash** position will be used to **enhance** our marketing position this fall'

Sam Tramiel, Atari

'We've got **$125 million** cash to spend'

Darryl Still, Atari UK

Atari

polygons around a screen quicker than anything else. The press also thought the machine was great, but was sceptical about its future. In 1993 Atari's losses were $48.9 million.

Jeff Minter has always been a fan of Atari hardware. Ever since the days of the Atari 800 he has been churning out psychedelic games full of llamas, sheep and toilets. In June 1994 he unveiled his *Tempest 2000* Jaguar cartridge, to universal acclaim. This one game probably did more for Atari's reputation than anything the company's marketing team had managed in the last five years. Admittedly, Atari gave Minter a great deal of creative freedom, but the fact remains that *Tempest 2000* forced everyone to start considering Jaguar as a contender.

Whether by accident or design, the Jaguar was released at the perfect moment. During 1994, sales of SNES and Mega Drive cartridges had been falling. The console kids wanted something new, something better, something quicker. Sega released its Mega Drive add-on, the 32X, and announced the Saturn. Nintendo revealed the Ultra 64 and Sony unveiled the PlayStation project. But the Jaguar was there, in the shops and there were even a few good games available for it. But although the machine sold steadily in the States, it failed to cause a revolution. Atari's position was still precarious.

Then Sega entered the picture. In 1990, in one of the most momentous events in its history, Atari took Sega to court in America for infringement of some of its patents. This was all down to Nolan Bushnell. Bushnell was a very canny businessman who, during the five years he was at the helm of Atari, had paid very good lawyers very good money to patent everything that the hardware and software teams invented, in order to prevent anyone ripping off any of Atari's innovations (a practice that was continued by Time Warner). When the Tramiels bought Atari, they were obviously more concerned with getting the company running smoothly than pursuing patent infringements, but, sometime in 1988, they decided to unleash the lawyers.

In late 1994, Sega settled out of court for $50 million cash and $40 million stock in Atari. Why did it cave in? Sega ostensibly fell foul of Atari's nine-pin joystick patent, but this alone wouldn't account for the amount of money involved. Many people in the games industry believe that Atari's patents are so all-encompassing that they effectively give it copyright on a whole range of videogames. It's possible, for example, that Atari owns the concept of sprites that move off the left of the screen and appear on the right – in other words, scrolling backdrops. And this is just one of over 70 Atari patents, all of which are thought to be pretty airtight. So it's no wonder that Sega opted to avoid a potentially disastrous judgement against it and throw in its lot with Atari.

A press release issued by Sega after the negotiations revealed the ramifications of the case: 'The two companies have entered into a software licence agreement for a specified number of games that would be made available on each company's present and future platforms.' So Atari has the option to release Sega games, and vice versa – Jaguar owners should soon see titles like the *Virtua* series and *Daytona* on their machine (but, as **Bob Gleadow**, vice president of Atari Europe, told **Edge**, 'The line stops at *Sonic*').

And it doesn't end with Sega. Atari is now gunning for other big hardware and software manufacturers – or, as an Atari source put it, 'Everyone who can afford to pay us' – and will be looking to companies like Sony and 3DO for compensation. It has already gone the distance with one Japanese giant, so it's not unfeasible that it will do it again. If other companies do settle in the same way as Sega has and invest money in Atari, then by the year 2000 there will be a large number of hardware and software outfits with a vested interest in seeing the Jaguar succeed. Atari had better get its skates on, though, because some of the patents only have another seven years to run.

Atari is fighting hard to regain credibility. Now that it has cast off its lacklustre computers and is focusing on the Jaguar, its future is looking rosier than it has for some years. It recently announced that its console would be distributed in the heart of the games industry, Japan. It has tied up a VR headset deal; it has a new Jaguar CD all-in-one ready for release in 1995; and work has started on a Jaguar 3 for release in 1996/7. And, of course, there are those handy patents knocking about. More impressively, there's some decent software coming out for the machine – most notably *Mortal Kombat 3* (which has been licensed directly from Williams), plus the *Virtua* series, *Daytona* and *Defender* (coded by Jeff Minter). Atari might just surprise us all yet.

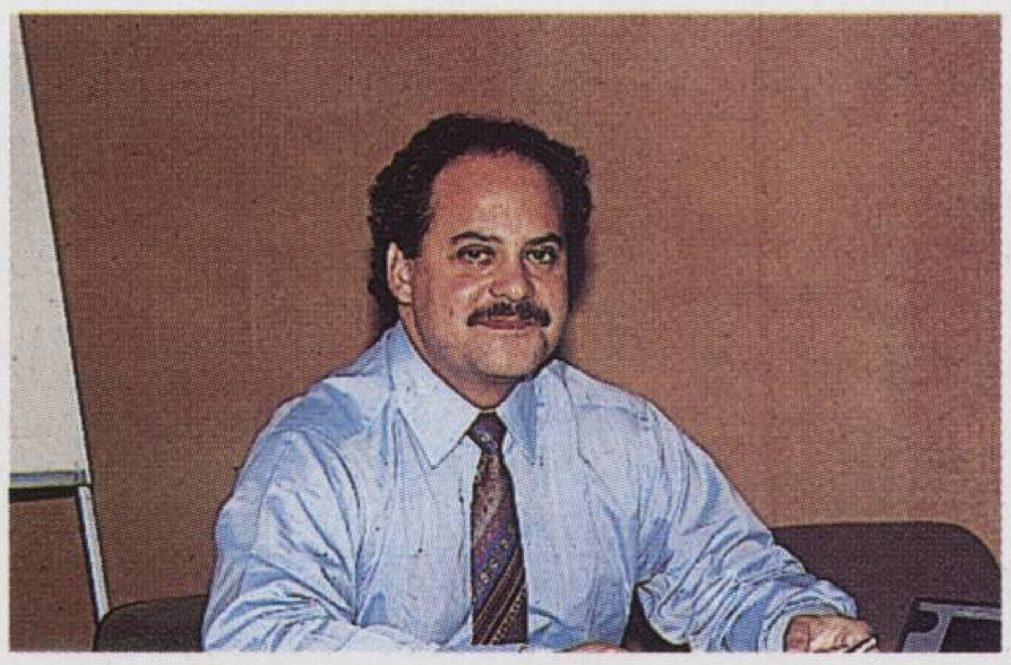
Forthcoming Jaguar hardware

Atari feels that '95 is the Jaguar's year, and a series of add-ons for the machine is to be released in the coming 12 months. The Jaguar 2 which has been much talked about in the press is actually the codename for the CD add-on (the 'toilet'), which will be released in February 1995 in the States. Of more interest is the all-in-one Jaguar/CD unit, which will be released in summer/autumn '95 for about £349, and will include the Jaguar hardware (slightly tweaked to run faster and cope with direct CD access) plus the CD unit. At about the same time, the company will release a series of connectability products. America (where local telephone calls are free) will get a Jaguar modem, while the UK will get a serial lead enabling Jaguars to be connected directly together. In summer 1995 an add-on called the Catbox is scheduled. This will operate as a sort of junction box between Jaguars, allowing the kind of multiplayer gaming previously only found on networks. And thanks to a recent deal with Virtuality, Atari will release a VR headset around Christmas '95 in the US, at a projected cost of $200. Developers are already working on conversions of arcade games for the unit.

The long-awaited CD add-on for the Jaguar is just the first in a long line of planned peripherals, including modem, link-up lead and VR headset

As Atari prepares for a brighter future, **Edge** talks to the company's president,

Sam Tramiel



Sam Tramiel, president of Atari: 'Focusing much of our energy on the multimedia software that will make Jaguar a success'

Edge Is it fair to say that Atari produces excellent products which suffer due to a poor public image?

Sam Tramiel We do make excellent products. We have made mistakes in the market, and some of the circumstances in the computer market just made it impossible to compete. The Jaguar will get proper marketing support and we and others are working hard to deliver great software. I'm sure that whatever poor image exists will change.

Edge Atari has shifted its emphasis from computers to consoles. Is this permanent?

ST Around the end of 1989, Atari decided that the computer hardware business was too cut-throat and a proprietary system could not succeed in the long run against the IBM/Intel juggernaut – just look what happened to Commodore. We decided to focus on the interactive entertainment market. If the business opportunities exist for us to get back into the computer business, we will. We feel that the Jaguar has a great future and is a very exciting platform at a great price.

Edge But why launch a console now, when everyone else seems to be moving into multimedia hardware?

ST The console approach enables us to have a low-price starting platform and gives the user the chance to add peripherals as he can afford them. The future peripherals will be a CD player, a voice modem, a VR headset and something else I can't reveal. The other new platforms are just too expensive for the consumer and this has been proven by the failure of Commodore's CDTV and the CD-i players. We are focusing much of our energy now on the multimedia software that will make Jaguar a success.

Edge Is it true that the Jaguar is a make or break product for Atari?

ST The Jaguar is not a make or break product but it is what we are focusing on. We are also going into the publishing business for PC CD-ROM and perhaps others as well, with another brand name.

Edge Do you think Atari can compete with the giants of the console market, like Sega, Nintendo, 3DO and Sony?

ST Atari invented the videogame business and during the late '70s and early '80s was the dominant company. The industry has been through a number of cycles and we are now entering the fourth cycle. Cycle two was dominated by the NES, cycle three has been shared by Sega and Nintendo and we at Atari have put a lot of effort into assuring the success of the Jaguar in cycle four. The Saturn is too expensive and Nintendo doesn't even have a product yet. All Nintendo is doing is trying to confuse the market with disinformation. The 3DO group has doubled the royalty to the software community and the hardware manufacturers aren't happy. The Sony product is just too expensive to be taken seriously and I can't see Sony focusing on a product that won't have the quantities due to the high price. It will be a player, but not a big one.

'The Saturn is too expensive and Nintendo doesn't even have a product yet. All Nintendo is doing is trying to confuse the market with disinformation'

Edge But the Jaguar is going to be in direct competition with a lot of heavily backed machines. Does Atari really stand a chance?

ST We have some very compelling advantages in terms of power, low price and lots of good software, with more on the way. We have a very experienced team. We also have the financing. Also important is our strategic investor, Time Warner, and our new partner, Sega, which gives us another source of good software.

Edge How much input does Time Warner have in Atari? Does it provide include monetary help beyond its obligations as a large shareholder?

ST Time Warner has no official input into Atari but we do talk to many of the Time Warner divisions and we value our relationship with them. For example, we were chosen to be included in the Time Warner Cable Full Service Network test in Orlando, Florida. We got a licence from Warner Brothers for the big Batman Forever movie, which is coming out next year. We also work closely with Time Warner Interactive and you'll see them publishing many titles on Jaguar in the near future. We have no need for more money at this time, but if we did have a good reason to raise more, Time Warner could be an option.

Edge Why has it taken Atari so long to pursue patent infringements? Why didn't you go after Sega and Nintendo when you bought Atari from Time Warner?

ST The issue of patents is very complex and we pursued the issues as soon as it was prudent to do so.

Edge Are you going to pursue Nintendo, 3DO, Sony and the other console manufacturers in a similar manner?

ST On the issue of patents I can only say that we will maximise their value and will pursue whatever means are necessary to ensure that they are not being infringed upon. We have some precedents and we look forward to more favourable outcomes.

Edge The Sega deal means that you can release any of its titles (excluding *Sonic*) on the Jaguar. What Sega titles are going to appear on the machine?

ST We haven't decided yet.

Edge Are we likely to see Nintendo games on the Jaguar?

ST Our relationship is not so great with Nintendo, but who knows what is possible in this time of détente?

Edge Europe has traditionally been a very strong marketplace for Atari product, but it's America and Japan that ensure a console's longterm future. What steps are you taking to sell Jaguar in these areas?

ST We have chosen to make the US the first important market for the Jaguar. It is starting to work. We just introduced the Jaguar into Japan and met over 60 thirdparty developers in Tokyo. It will not be easy selling a US-made machine in Japan, but we are going to try.

Edge In his book, Game Over, David Sheff alleges that Jack Tramiel imagined a sweet revenge on Commodore for the way in which he was ousted from the company. If this is true, is he happy now?

ST We did not buy Atari as a road to exact revenge on Commodore. It was a good opportunity to acquire the best-known name in videogames and start a new venture.

Edge Is it true that Atari is considering buying the shattered Commodore company?

ST We aren't happy about the demise of Commodore and have no plans to acquire the leftovers.

Edge Finally, what do you think the future holds for Atari?

ST Success.

C A L C U L U S

*No Deposit Buy Now Pay Later.

Yours for 6 months then pay todays Retail Prices. No Deposit, Instant Credit, No Strings Attached

The Future is here...and it Works

The Cybermaxx is an astonishing product and provides an experience that is almost impossible to describe. Designed for use with any IBM compatible PC, 386 and above the headset weighs just 14oz and and immerses you totally in a world of sound and movement that really is Virtual Reality. Astonishing 3-D stereo scopic graphics jump out at you with dazzling high intensity colour and realism. Move your head left, right , up and down, characters and scenery respond instantly and come into view. This really is total game play! A pair of stereo speakers built into the headset provides a feeling of being there that is truly awesome. "Footsteps in your right ear and behind you, turn your head fast, there it is, fire - you're still alive!"

Product Specification

☛ Displays: Two 0.7 inch active matrix colour LCD ☛ Resolution: 120k and 180k Pixels with depletion filters ☛ Field of view: (Horizontal) 62 degrees ☛ Yaw tracking: 0.0360 degree s ☛ Pitch and Roll tracking: +/ -45 degrees ☛ Weight :14 oz

Complete Startup Software kit

Ghost Train - Synthetic Dimensions (Diskette)

A virtual reality amusement park ride, in which the headset wearer is fully immersed in a computer - generated haunted house. The viewer travels along a preset monorail, and encounters a wide variety of ghosts and goblins and other nasties. A wonderful introduction to the State of the Art tracking capabilities and 3-D stereoscopic point of view of the Cybermaxx headset.

System Shock - Origin (CD - ROM)

This is a 3-D, stereoscopic adventure game set within the confines of a futuristic space station. Incorporating high resolution animated texture mapping in ten breathtaking levels of full and multi - screen viewing. As players career through the labyrinths of cyberspace, they are fully immersed in an interactive landscape.

3-D Ware - Virtek (diskette)

A sophisticated virtual reality world building toolkit. Incorporating cutting edge 3-D graphics technology, this program is a complete VR development tool that allows the user to create and manipulate three dimensional shapes and images in real time. 3-D Ware comes with a built in library of functions and paradigms which allow users to write anything from games to molecular modelling.

VR Slingshot - Virtual Entertainment(Diskette)

A real time physics based 3-D environment that allows for a host of gaming applications. Designed to allow two people to compete in a variety of virtual cybersports via modem. Unlike most games where the objective is to completely annihilate your opponent, in VR Slingshot, the objective is to out perform your opponent. The games incorporate aspects of dogfighting, boxing, bumper cars, pumper planes, lacrosse, and handball. VR Slingshot provides real time computational airflow simulation, real - time physics based interaction, advanced flying and driving simulation and stereoscopic 3-D graphics 3-D sound.

Software is Crucial

The astonishing impact of Cybermaxx has already allowed software developers to completely rethink the capability of their product. No longer limited by a flat screen image new titles will fast be coming to the market and sooner than you would believe possible

CyberMaxx VR Headset £499 ex VAT
£586.33 inc VAT

New Titles Arriving Soon

Wings of Glory **£39.99**
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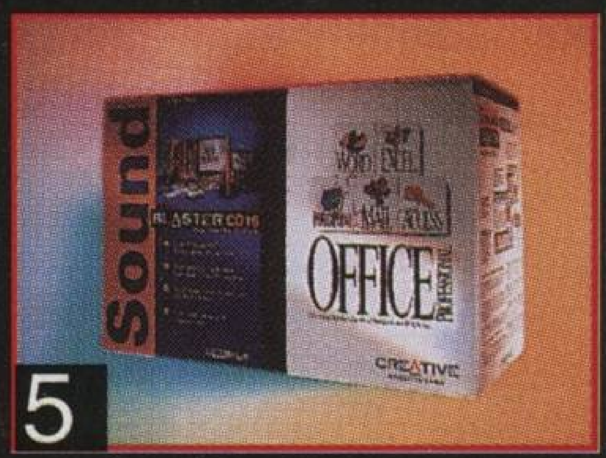
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Toh Shin Den Clockwork Knight **Motor Toon Grand Prix**
Alone In The Dark 3 **Samurai Shodown 2** Iron Soldier

Testscreen

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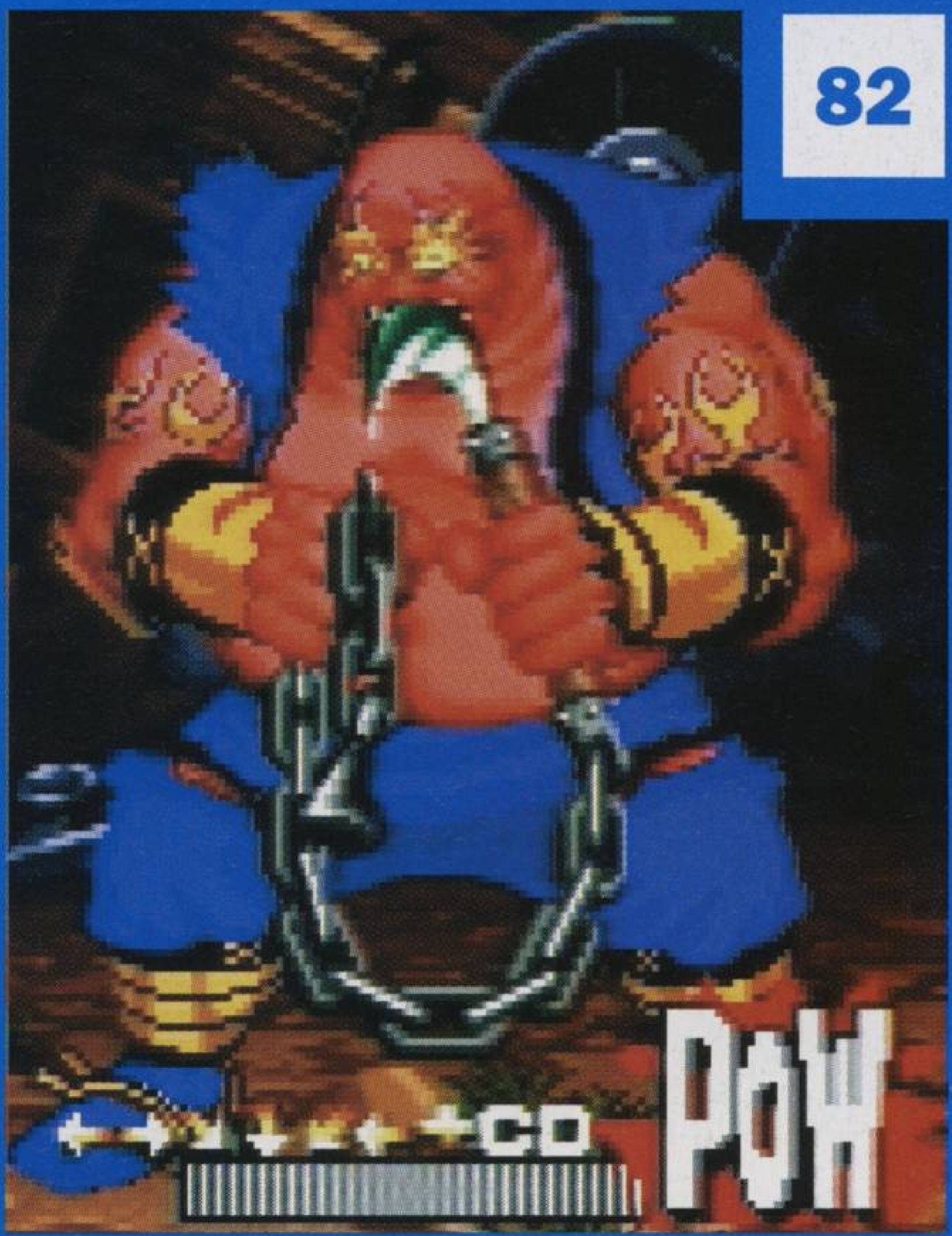
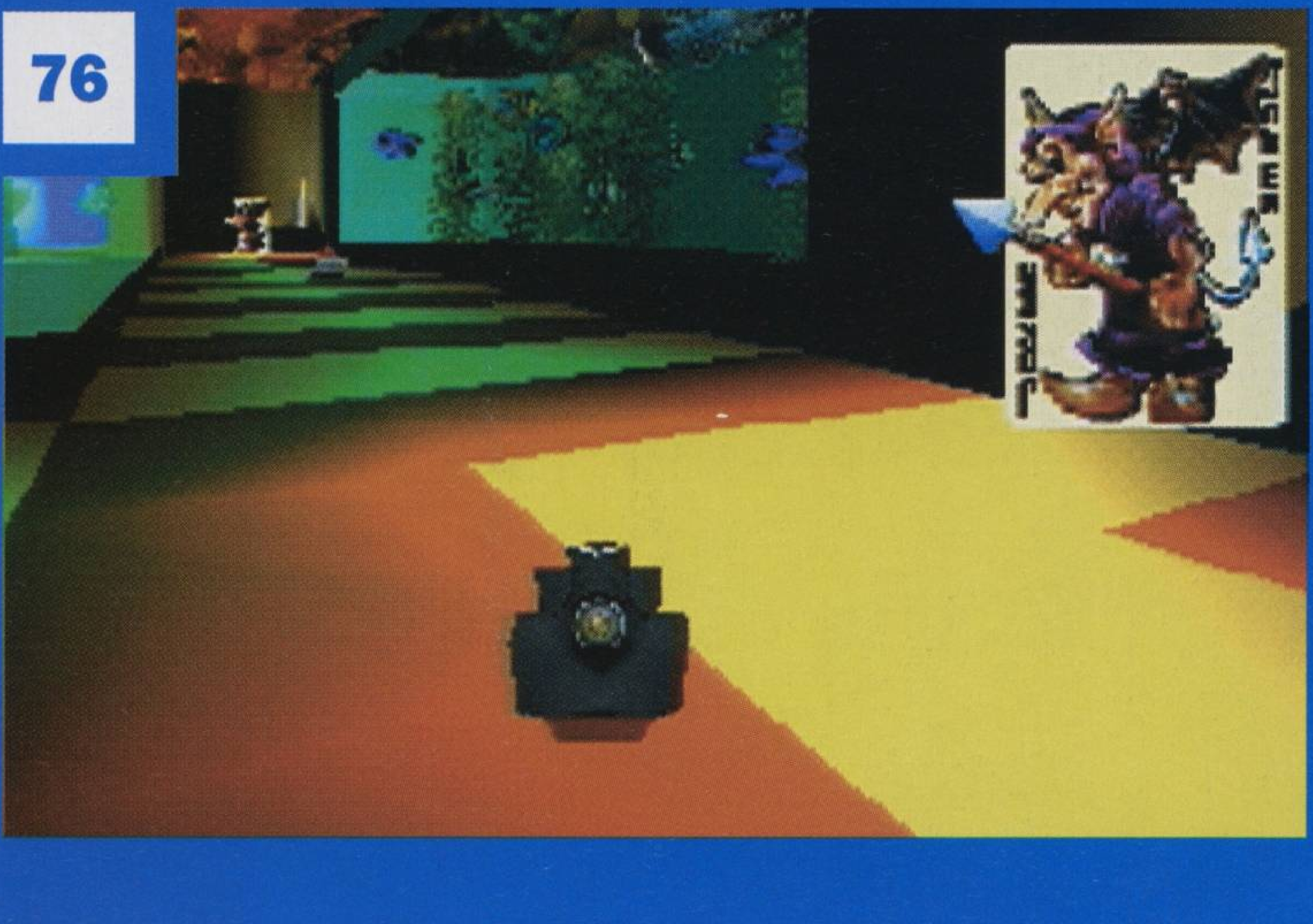
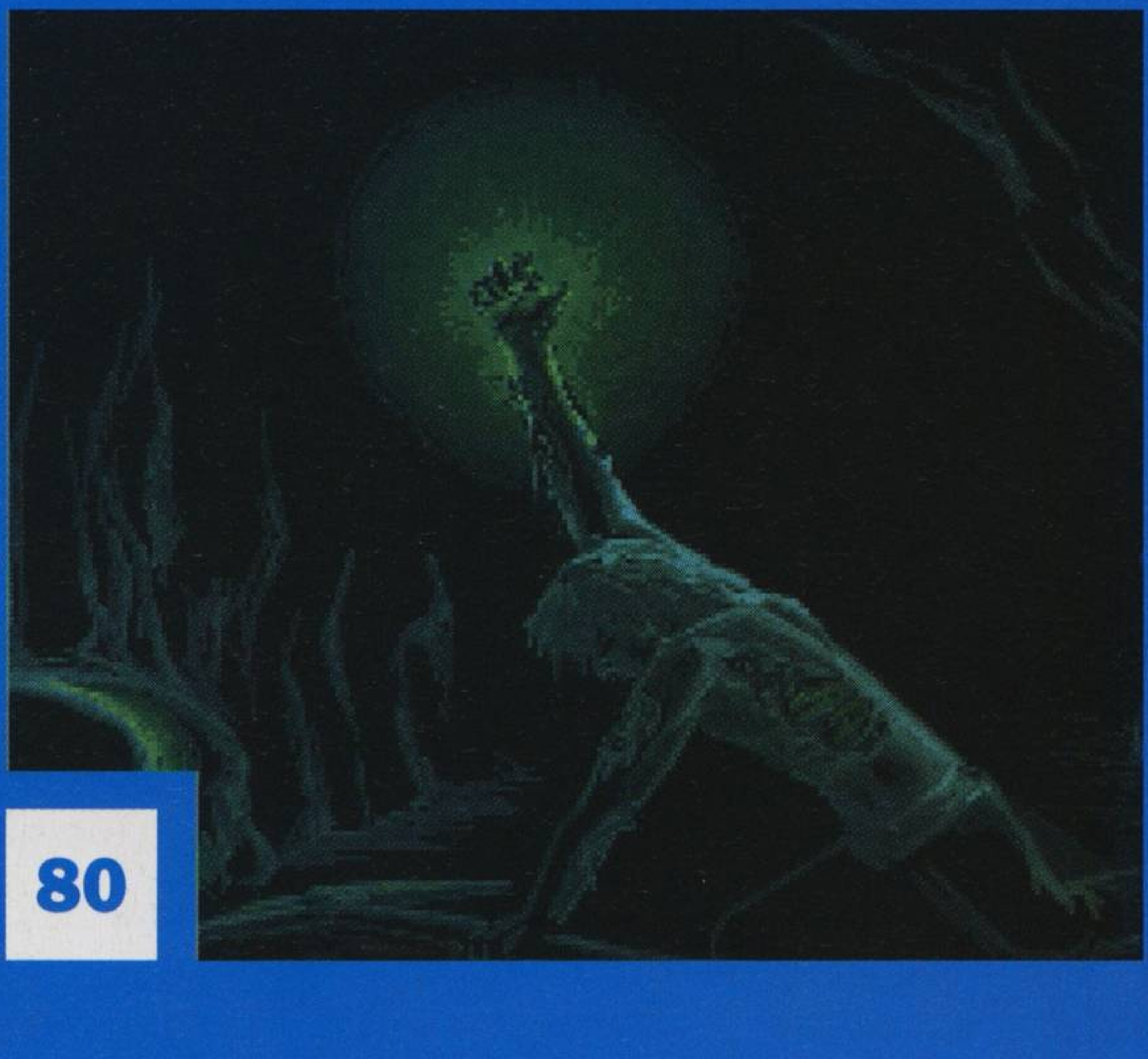






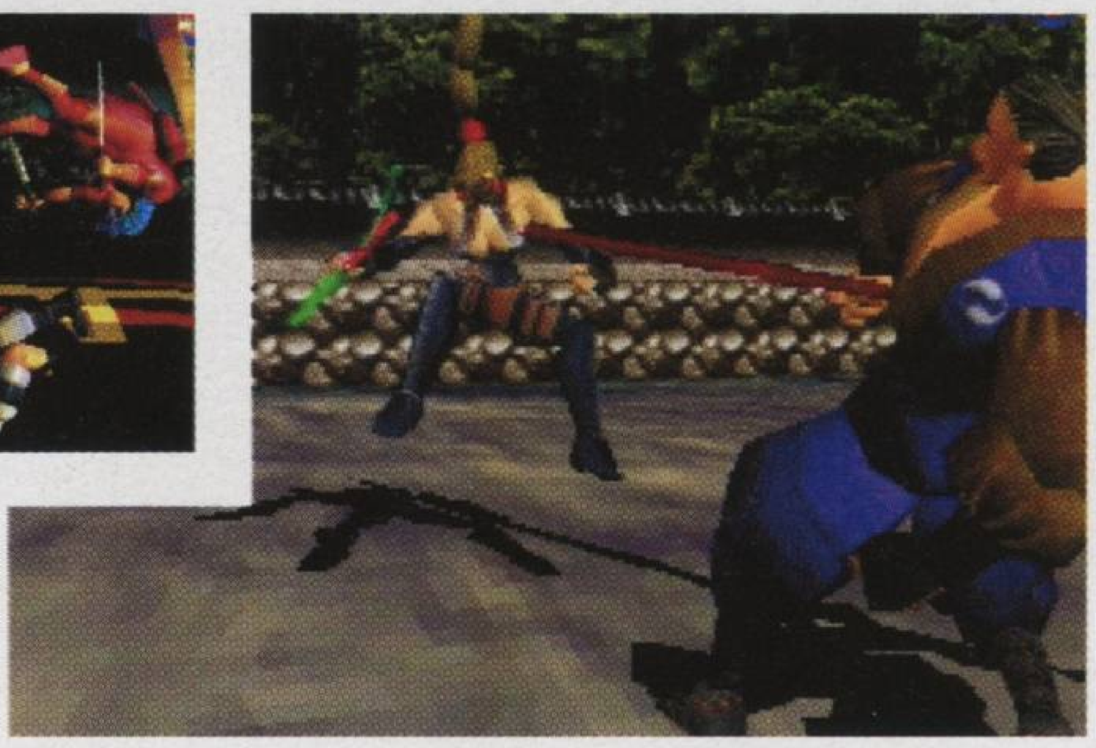
Toh Shin Den

Format:	PlayStation
Publisher:	Takara
Developer:	Tamsoft
Price:	¥5800 (£35)
Release:	Out now (Japan)

Until now, there has been no real basis for a direct comparison between Sega's Saturn and Sony's PlayStation. But with the arrival of Takara's *Toh Shin Den*, anyone who still believes that Sega holds the upper hand in the hardware wars would be hard pushed to argue their case.

Toh Shin Den is simply gorgeous. And whereas *Motor Toon GP* takes Gouraud shading to its gaudy extreme, *Toh Shin Den* employs all of the graphical tricks at its disposal in measured amounts; the result is impressive, yet easy on the eye.

Of course, it could be argued that *Virtua Fighter* is supposed to be a reasonable facsimile of its coin-op parent, and so has no chance to show off the Saturn's real power. But it takes something of a leap of faith to believe that the Saturn could replicate *Toh Shin Den* with any degree of accuracy. In fact, the converse seems to be true: while we have yet to see how the Saturn handles the graphical excesses of *Virtua Fighter 2*, there is no doubt that Sony's machine could cope quite admirably.

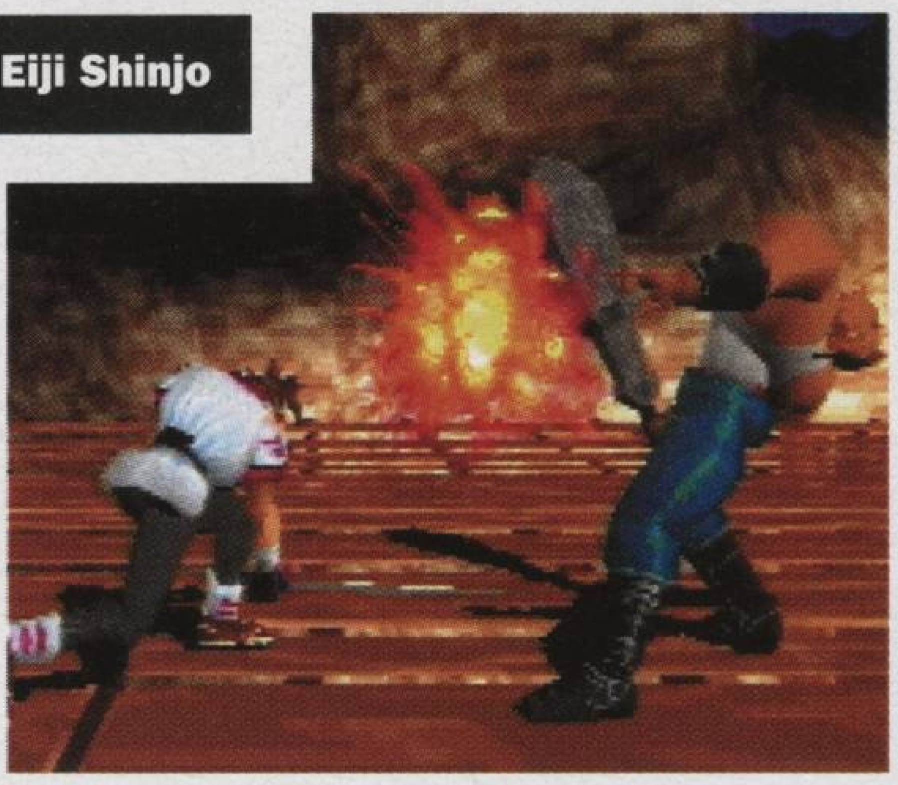


***Toh Shin Den* dispenses with gentlemanly fisticuffs in favour of large, pointed weapons**

Duke B Rambert

This armoured giant from France is slow and lacks fireball attacks. However, he can perform some fierce charging/jumping attacks (right, top and middle). He also grabs his opponent and smacks their face into his knee (top), and has a two-handed sword which extends to make long distance contact (right)

Eiji Shinjo



This Japanese warrior's favoured weapon is the ceremonial *nihontoh* sword. Among his arsenal of special moves are a flaming flying kick (above), fireball (top), and a useful sliding kick (middle). However, his killer move is a flaming shoulder charge (left) which is followed by a vertical, spinning leap

One area in which Saturn *Virtua Fighter* does have the edge is in animation. The motion-captured antics of *VF*'s combatants are uncannily authentic – especially Lau's high jump onto his downed opponent's chest, which is just plain spooky. *Toh Shin Den*'s characters perform with similar fluidity but their movements aren't as realistic or dramatic; their actions look like the product of talented animators rather than the stored motion patterns of real humans.

Then again, Tamsoft's proprietary 'Hyper Solid' 3D modelling system, leaves little room for glitches and gaps – unlike Sega's offering, which tends to leave its fighters with transparent torsos and flickering limbs, especially during replays.

But, visuals aside, how does Takara's eye-feast play? Certainly, it follows the well-worn template of previous beat 'em ups, with the now-standard system of kick, punch, jump, crouch and convoluted special attacks, so no marks for originality there.

Similarly, the addition of weapons merely throws a hint of *Samurai Shodown* into the proceedings and eliminates much of the close-quarters combat. The many spectacular throws which featured so prominently in *Virtua Fighter* are missing from Takara's beat em up, to the detriment of the gameplay.

And once the moves become familiar, there's a frustrating lack of response. *Toh Shin Den*'s fighters take an *age* to get back up from a fall, and once up there's an annoying time lag before the next attack can be performed.

Four views are available: Normal (top left); Overhead (top right); Long (bottom left) and Sky (bottom right). A user-definable perspective would have been preferable – and more useful

Ellis

The former circus dancer's dainty stance belies her mastery of the dirk. Her moves include a flying dive (above), sliding knife attack (top) and mid-air somersault kick (bottom). Ellis can also jump over her opponent and drop-kick them in the back – shown here by Ellis in red vs Ellis in white (right)

Fo Fai

This wizened Chinese wizard is armed with iron claws on either arm, with which he can skewer and throw his opponents (top). His flying kick (above) is supplemented by huge magical fireballs, which he can unleash in mid-air (middle), on the ground (left) or underneath himself which he rolls along on

testscreen

The ultimate adversary in *Toh Shin Den* is a fireball-hurling giant called Gaia. The final conflict takes place *inside* a revolving torus on a transparent platform. And the effect is awesome

Continued

It also has to be said that *Toh Shin Den* has no genuinely innovative moves; the odd face-slapping and headbutt, but nothing really unusual. It's almost as if Japanese designers are scared of adding anything excessively different for fear of alienating a captive audience. Let's face it, the beat 'em up hasn't really progressed much since the original *Street Fighter II* stepped into the arena.

Toh Shin Den even takes something of a retrograde step in removing the need to learn and perform the special moves – there are at least two moves initiated directly from the front finger buttons. None of that 'left, diagonally down, down, fire' malarky – simply press and go. And although this does make the game more instantly accessible, beat 'em up purists will no doubt prefer to remove the option in favour of relying on joypad prowess under pressure.

The upshot of all this is that, to be honest, *Toh Shin Den* is a distressingly ordinary beat 'em up, given the current state of the art of the genre and the power of the host machine. But, like many games, *Toh Shin Den* is more than the sum of its parts. The abundant combat action is complemented by outstanding aesthetics, making it more of an experience to play than the usual 2D fare and even nudging *Virtua Fighter* into the shade – presumably to Sega's intense chagrin.

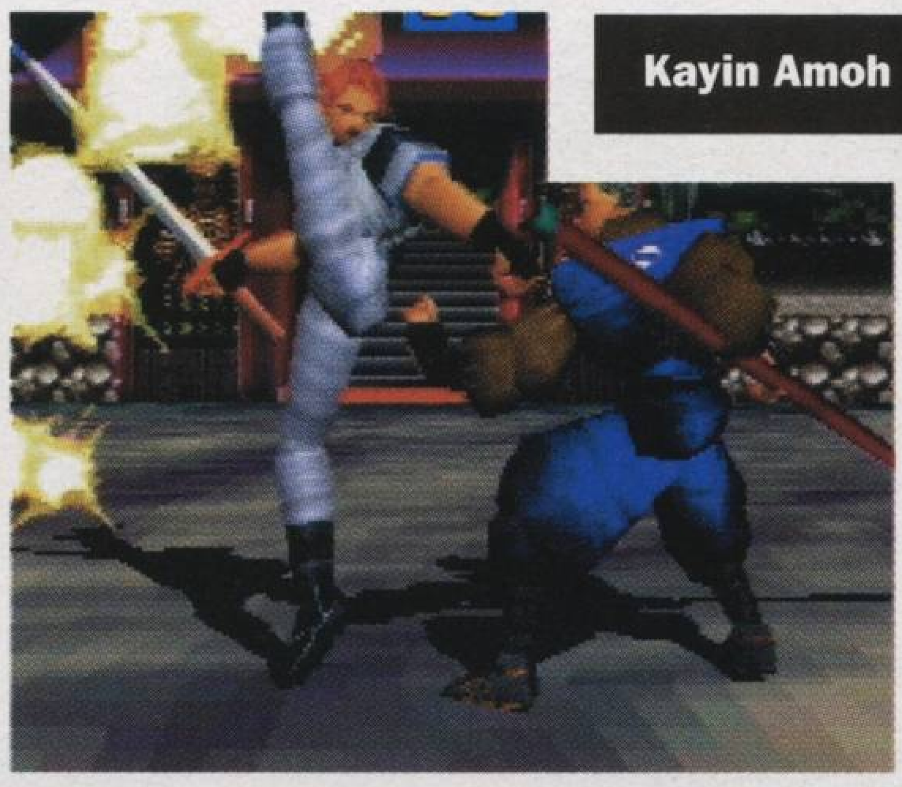
The solidity and believability of the visuals adds enormously to the whole spectacle and make it a great deal more enjoyable to play. The scenery is a delight to behold (another advantage over *Virtua Fighter*'s plain backdrops) and the only real disappointment is the sound, which often lapses into ill-fitting oriental muzak.

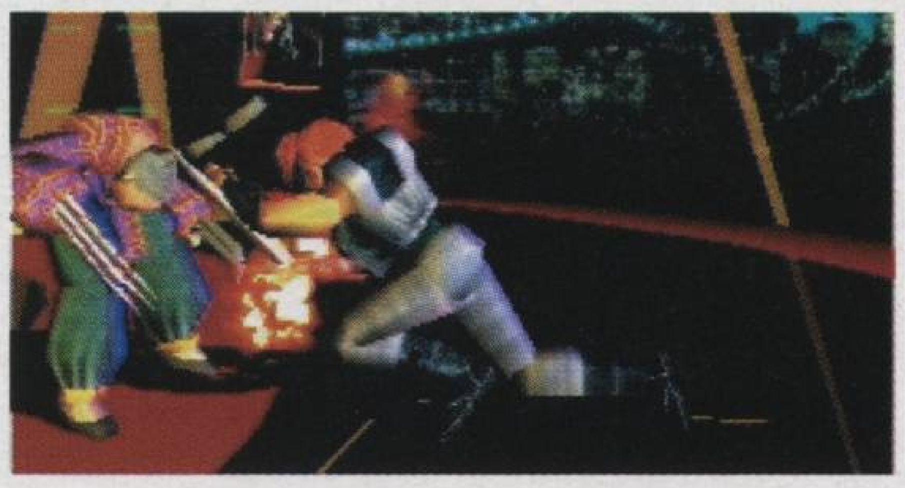
But in the final analysis *Virtua Fighter* just pips it. Sega's unmatched coin-op heritage has bestowed on the Saturn game a level of playability that the new contender can't quite match. The hands-on action, the speed, the range of moves and the glorious animation put *Virtua Fighter* just ahead of *Toh Shin Den* on points.

Edge rating: **Eight** out of **ten**

Somersaults are extensively employed to avoid attacks (main). Kayin's arena (above) features a video wall which actually shows the battle taking place (and even the screen itself!). Most moves are accompanied by tiny explosions, which often obscure the action taking place

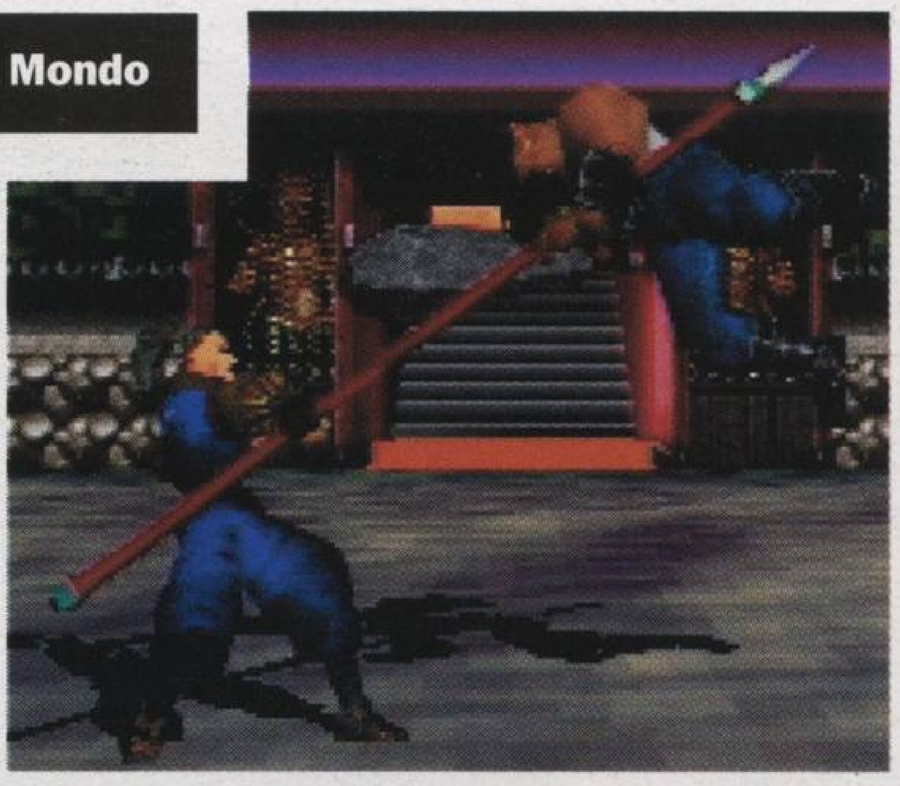
Kayin Amoh

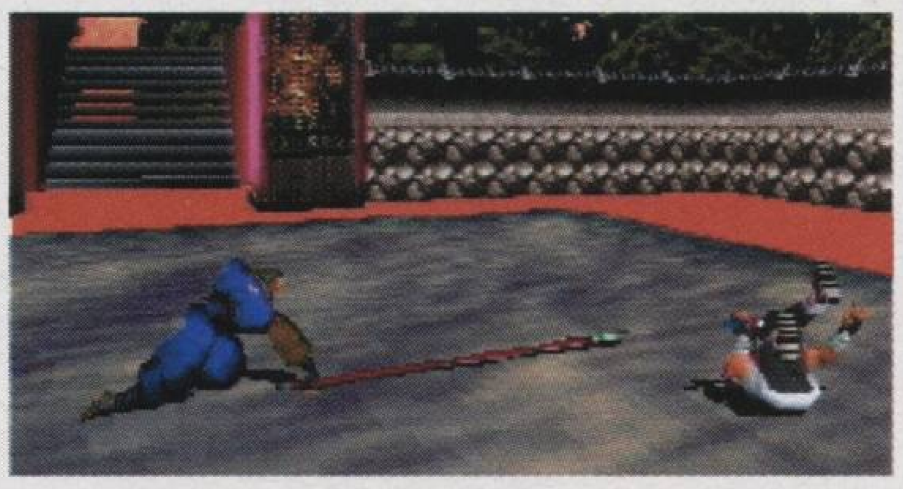




The offspring of a Scottish/Japanese alliance, Kayin brandishes a claymore and is well versed in martial arts. He is one of the few fighters who can perform a throw (above). Other moves include a fireball, a semicircular kick (top), a mid-air somersault kick (middle) and his special charging attack, the 'Deadly Ray'

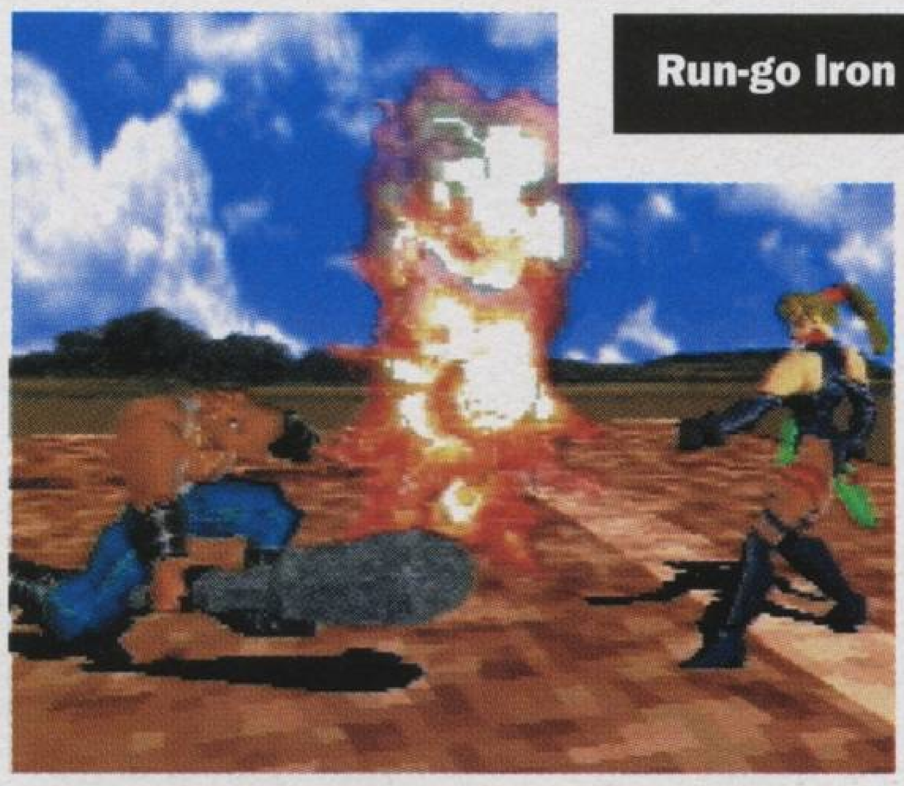
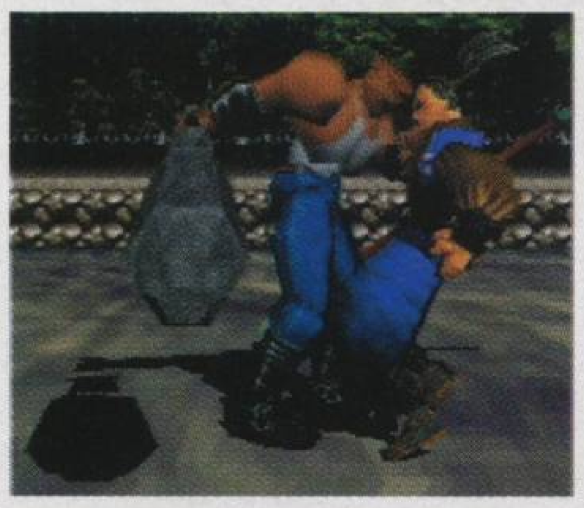
Mondo





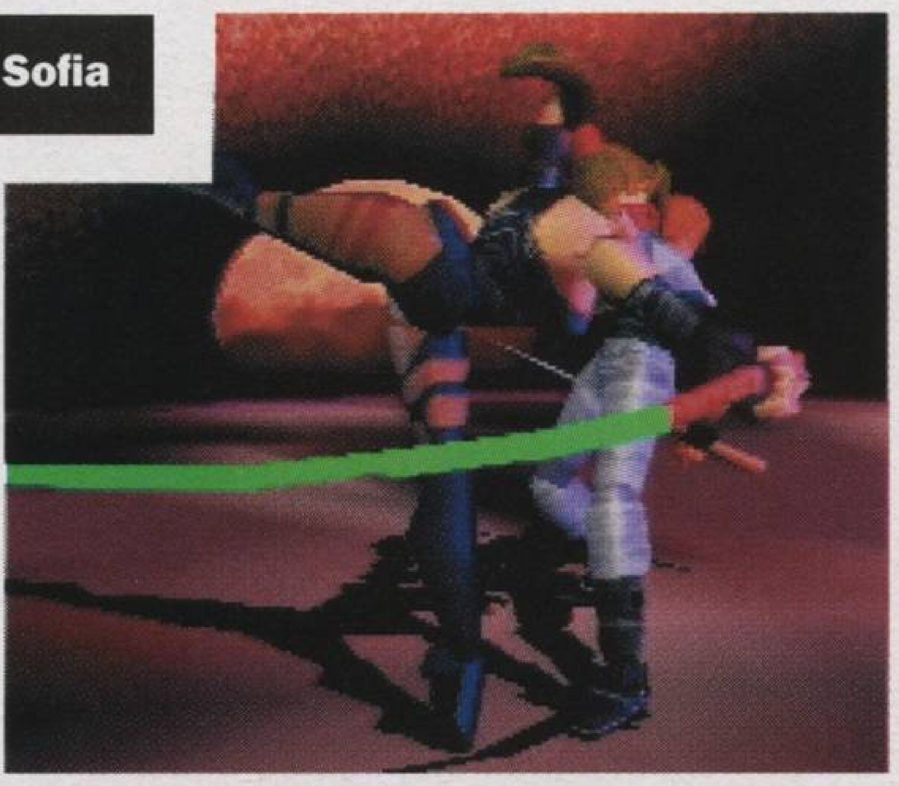
Mondo is one of *Toh Shin Den*'s most impressive characters, wielding a huge spear to great effect (top). As well as using it to launch fireballs in mid-air (above), Mondo can whirl his weapon in front of him like a propeller (middle). Similar to Duke's sword, Mondo's spear mystically grows to increase his reach (left)

Run-go Iron

This mace-wielding American is a lumbering giant with a surprising turn of speed. His array of moves are fairly typical. He can produce a wall of fire (top), perform a massive jump (middle, captured here during takeoff) and slamming the mace down elicits a fireball. However, anyone venturing a little too close may well be the victim of a severe nut-dropping (above)

Sofia



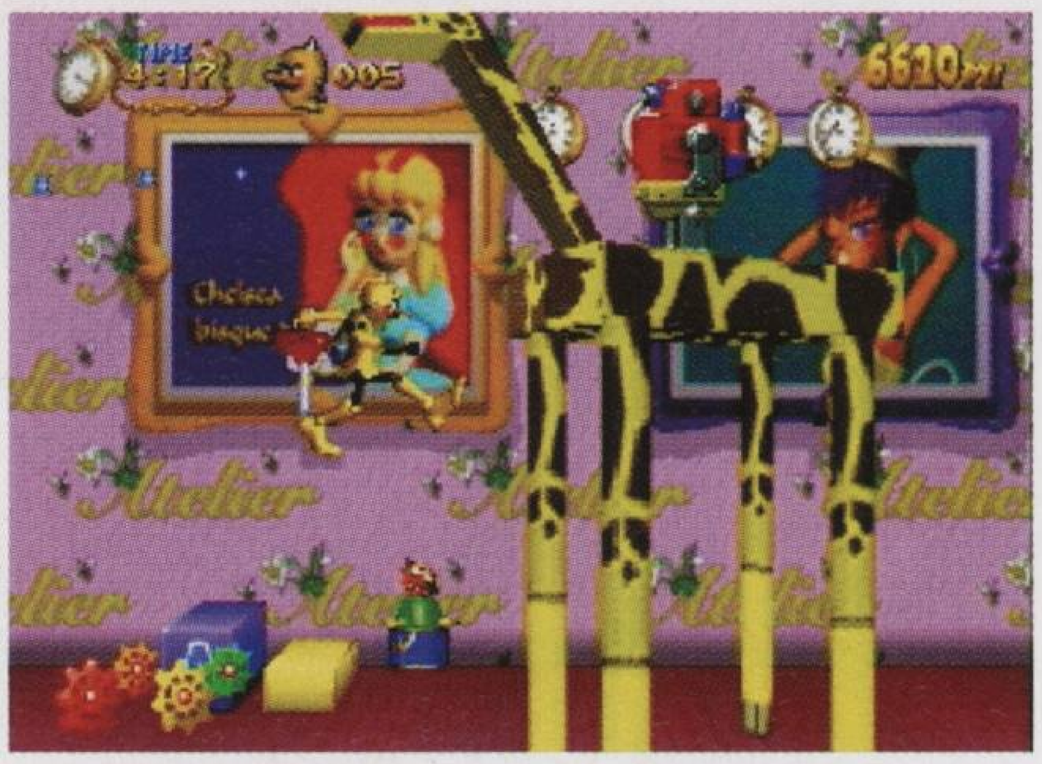
This ex-KGB agent is fast but has a limited number of moves. The most harm-inducing is her whip pirouette (top), which lashes her adversary. She can also unleash fireballs (middle) and rapidly flail the whip in front of her (left). Her funniest (if not most useful) attack is the dreaded face-slap (above), in which she grabs her opponent by the collar and gives them a good thwacking

Clockwork Knight
Pepperouchau's Adventure

Format: Sega Saturn
Publisher: Sega
Developer: In-house
Price: Import (call)
Release: Out now (Jap)

The SGI-rendered intro sequence follows Pepperouchau's bumbled efforts to win Chelsea's heart. Things soon go horribly wrong…

Although Pepperouchau can't move into the screen, many of the nasties, such as this boxing glove, can



You need to see *Clockwork Knight* in motion to fully appreciate its graphics. This giraffe looks incredibly solid as you manoeuvre around it

Anyone familiar with John Lassater's award-winning computer-generated animations will immediately feel at home with *Clockwork Knight*. The characters, and indeed the whole theme of the game, bear a remarkable resemblance to Tin Toy, arguably Lassater's finest work to date.

This source of inspiration is particularly obvious in *Clockwork Knight*'s memorable two-minute animated intro. Set in a child's playroom, the sequence chronicles the events that take place when the cuckoo clock strikes midnight and the toys, predictably, come to life. Not only have Sega's Silicon Graphics staff done a remarkable job in rendering the characters, but they've also created something that works as an entertaining animated short in its own right.

But although the quality of the original animation can't be faulted, the Saturn's limited video capability means that the overall impact is ultimately rather unsatisfactory. The sequence has a grainy, almost 3DO-ish feel, with a disappointingly low colour resolution.

The ingame graphics, however, go a long way towards making up for this. The hero, Pepperouchau, exudes charm, and the cast of co-stars sparkles with all manner of delightful touches. The boss characters are particularly worthy of mention – it's fair to say that end-of-level guardians have never impressed as much as *Clockwork Knight*'s. One, a Transformers lookalike, initially takes the form of a giant, stomping robot, but after several hits it mutates into a jet fighter and whisks off into the background, banking and diving in 3D, before returning to strafe you.

But *Clockwork Knight* also suffers unexpectedly from a classic console flaw. In a later section of the game, Pepperouchau

Run away from boss characters and the game camera zooms out with incredible fluidity

Because later bosses are constructed from texture-mapped polygons, the Saturn is able to manipulate them with relative ease. This giant transforming robot is a perfect example

comes up against nasties in the form of sticks of dynamite. Get too close and they self-ignite, resulting in a natty little explosion but also an ugly dose of sprite flicker – a side effect that can probably be attributed to sloppy sprite masking. This is not a major failing, but it shows that the next-generation machines, when loosely programmed, are still susceptible to technical slip-ups that many buyers will have assumed were a thing of the past.

Clockwork Knight's backgrounds have been the object of avid interest since Sega first unveiled the unique 3D styling technique used for the game. The finished effect is nothing short of dazzling, with the bitmapped 3D obstacles in Pepperouchau's path conveying a wonderful solidity and depth, and textured surfaces now moving in unprecedented parallax. Surfaces are made even more realistic by grain effects on wooden panelling and shiny metallic finishes on kitchen fixtures.

But, unfortunately, it looks as if Sega has lavished so much care and attention on the game's visuals that there was little left over for the gameplay. For the most part, *Clockwork Knight* is a fairly routine platform game. Strip away its undeniable visual sheen and there's nothing that pushes the genre into new realms. It plays solidly enough, but in design terms it falls into the same trap as virtually every post-*Mario* platform game, borrowing so many elements from other titles that it often feels plain tired.

One cribbed element which stands out is the inter-level bonus game. By following the movements of a group of rotating boxes and then choosing the correct one when they come to rest, you can acquire extra lives and bonus icons. Fair enough, except that after several attempts it's possible to build up a ridiculously

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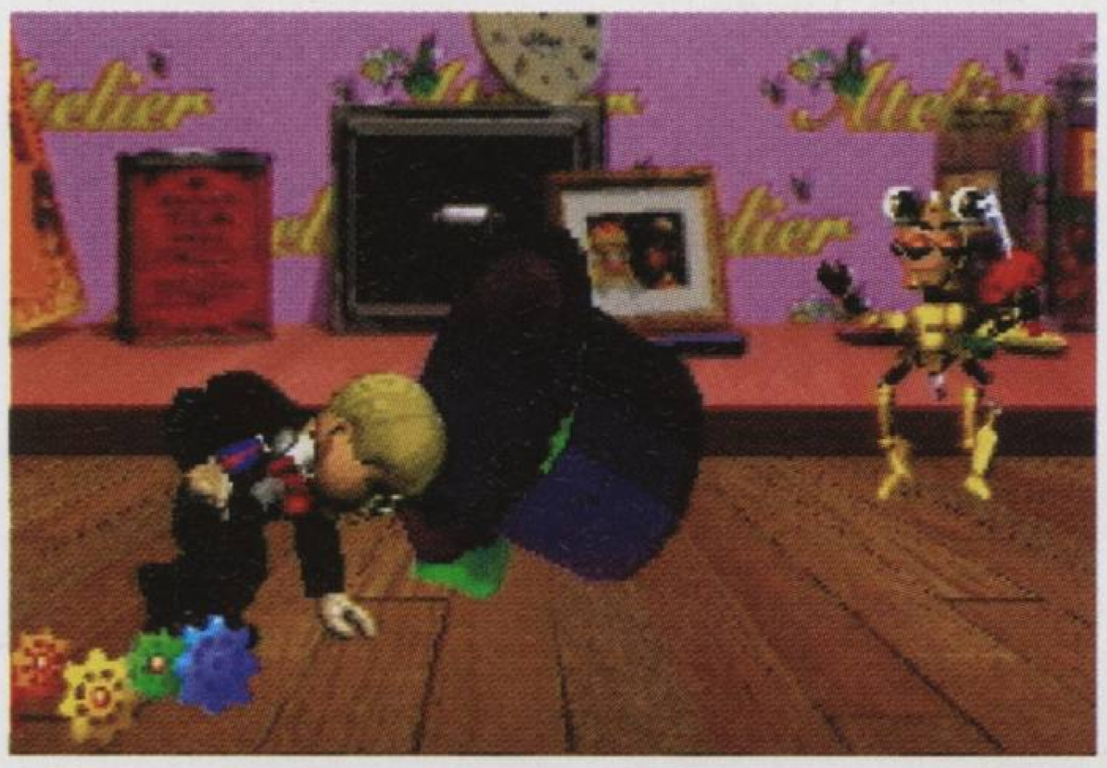
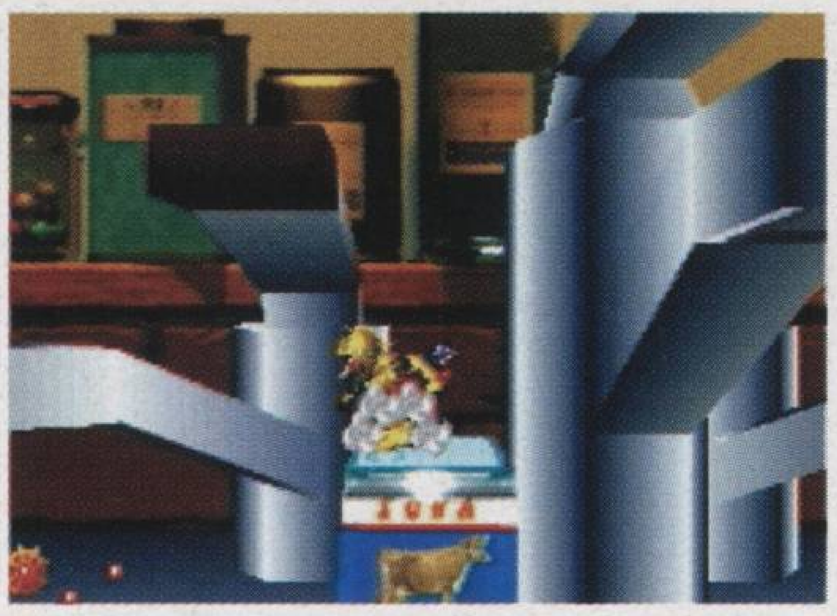


The first boss takes the form of a sinister boy doll (top). The bonus game offers extra lives and tokens as prizes (above). Pepperouchau meets another clockwork-operated toy (right)



Set pieces, such as these toppling doll's houses (above), perfectly demonstrate the Saturn's ability to handle heavily texture-mapped surfaces. The faces of these toy boxes have been digitised (above left)

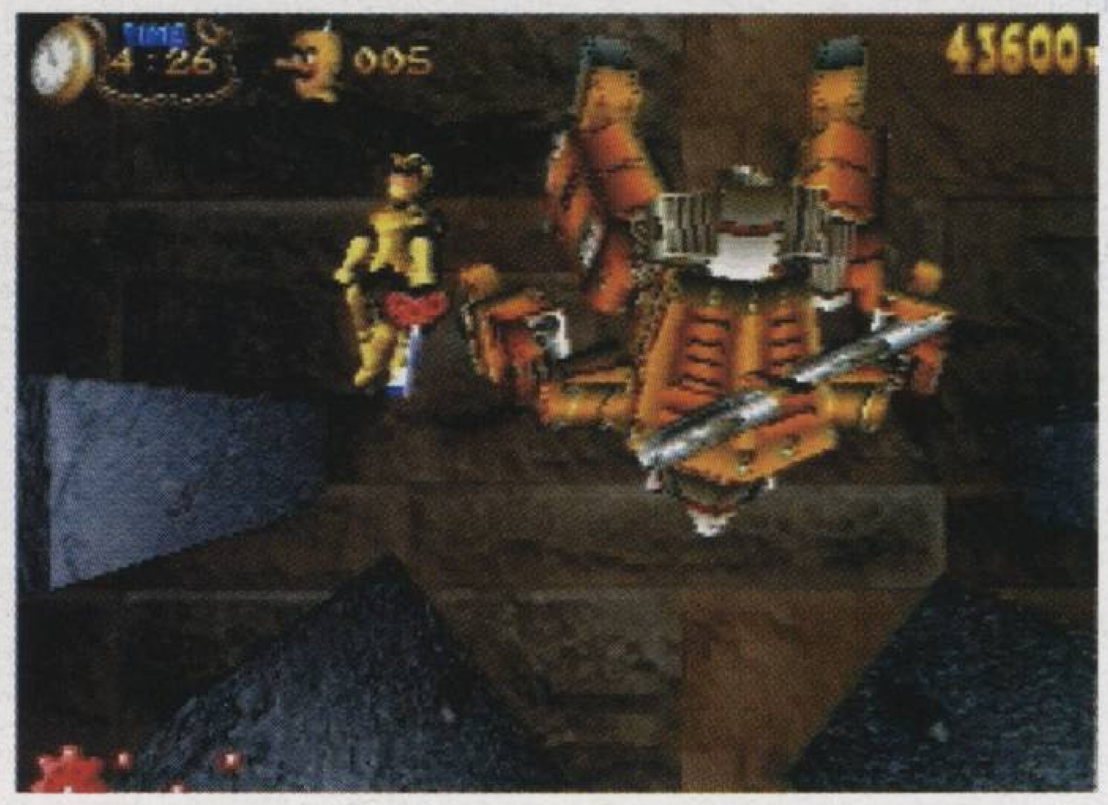
From bottom: the game's handling of perspective creates some wonderful scenes; this train moves into and behind the background; footballs can be used as weapons

large complement of lives, which significantly reduces the challenge. In fact, **Edge** completed the game on its default difficulty setting (labelled 'normal') at its first attempt, a task which lasted only a few hours.

Producing a platform game that genuinely breaks new ground is, of course, a tough task nowadays. But a groundbreaking game is exactly what Saturn owners will be expecting. There's no point buying next-generation hardware unless the software not only looks like cutting-edge 32bit material but is also better to play than its forebears. Sadly, *Clockwork Knight* fails on the latter count. The wait is now on for *Clockwork Knight 2*, currently in production at Sega Japan. Maybe Pepperouchau's next mission will be a more convincing all-round success.

Edge rating: **Six** out of **ten**

Agent orange



The penultimate boss jumps around angrily, eventually crashing through the platform below to send you both plummeting (above left and right). It then reforms to create this baddie (top right)

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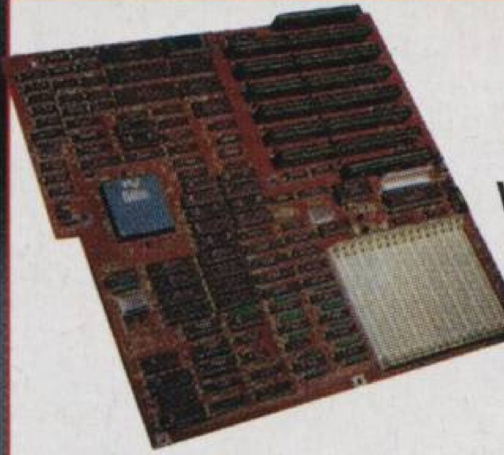

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Motor Toon Grand Prix

Format:	Sony PlayStation
Publisher:	Sony Computer Entertainment
Developer:	Poly's New Generation Game Making Project
Price:	¥5400 (£34)
Release:	Out now (Japan)

The Gulliver House course (above and left) takes you on a Lilliputian tour of pool tables, fish tanks, etc

The wacky racers in *Motor Toon Grand Prix* are a far call from the street-legal hotrods of *Ridge Racer*. The cartoon theme continues through to the colourful scenery and odd settings

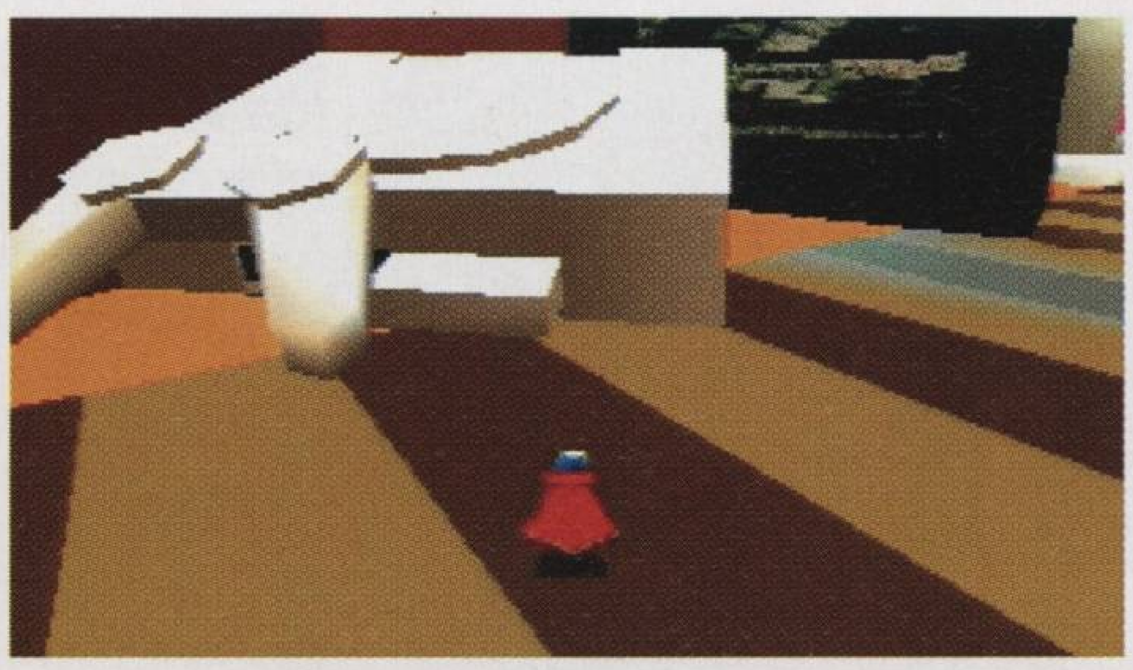
Perhaps in an attempt to emulate Nintendo's unnatural ability to breathe life into its game characters, Sony has eschewed the conventional racing game (a market already cornered by *Ridge Racer*) for one of its star PlayStation releases and chosen to make *Motor Toon Grand Prix* wildly idiosyncratic.

Based on characters designed by Susuma Matsushita, whose work graces the cover of Japanese games journal Famicom Tsushin every week, the vehicles in *Motor Toon* are crazy extensions of the drivers. Thus the robot Bolbox metamorphoses into a clunky metal off-roader, the Penguin Brothers transform into a Dick Dastardly-style racer, and so on.

The cartoon (motortoon?) theme is continued in the way the cars bend, stretch and jiggle around the course, and by the gloriously colourful settings for each race.

Ridge Racer convinced everyone of the PlayStation's graphics credentials, and *Motor Toon*'s sumptuous scenery merely reinforces its reputation. The extensively Gouraud-shaded landscapes provide the perfect backdrop for the not-entirely-serious nature of the game, and the three main Grand Prix courses – Toon Island, Plastic Lake and Gulliver House – offer some genuinely breathtaking views.

Graphics aside, any racing game lives or dies by the way it



The Gulliver House grand prix course features translucent fishtanks – complete with fish (far left) – and a polygon PlayStation. Sadly, the TV picture is just rolling static

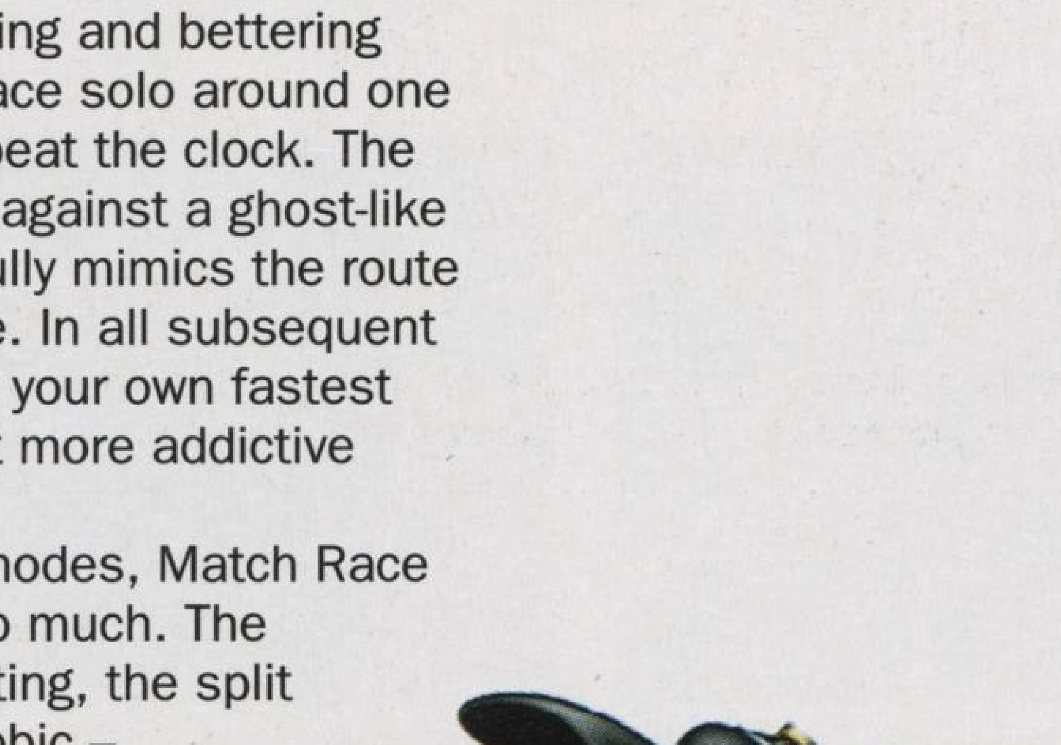
Now de rigeur for polygon racers is the multiple view option. Not to be outdone, *Motor Toon* has four such viewpoints. From the extreme helicopter view (top left) you zoom in to the ubiquitous in-car view (top right). There's also a handy rear-view mirror option which is used to check up on the competition approaching from behind (bottom row). Unlike *Ridge Racer*, *Motor Toon* is best played using one of the two high viewpoints

plays. *Motor Toon*'s gameplay is as simple as it gets. There are no hidden agendas; it's just a matter of completing the race and coming first. Which, given the jolly nature of *Motor Toon*, is something of a missed opportunity. Secret routes, jumps and bonuses would have added some much-needed depth to the game and significantly extended its lifespan.

There are four race modes to choose from: Grand Prix, Time Attack, Match Race and Dual Race, the latter two only available as splitscreen, twoplayer, twin-joypad races. Grand Prix mode speaks for itself, and provides *Motor Toon*'s main allure. Time Attack is an ingenious way of playing and bettering your own times. First you race solo around one of the courses in order to beat the clock. The next race sees you playing against a ghost-like doppelganger, which faithfully mimics the route and speed of your first race. In all subsequent races you compete against your own fastest time, which is actually a lot more addictive than it sounds.

In truth, the twoplayer modes, Match Race and Dual Race, aren't up to much. The courses aren't very interesting, the split screen is oddly claustrophobic – your forward view is limited – and both suffer from one major flaw: players can't choose the same car. The whole idea of pitting one person against another is that the challenge is identical for both participants. And given that the cars in *Motor Toon* all have widely varying characteristics, the lack of an option to select

The Plastic Lake grand prix course is a sumptuous advertisement for 24bit graphics



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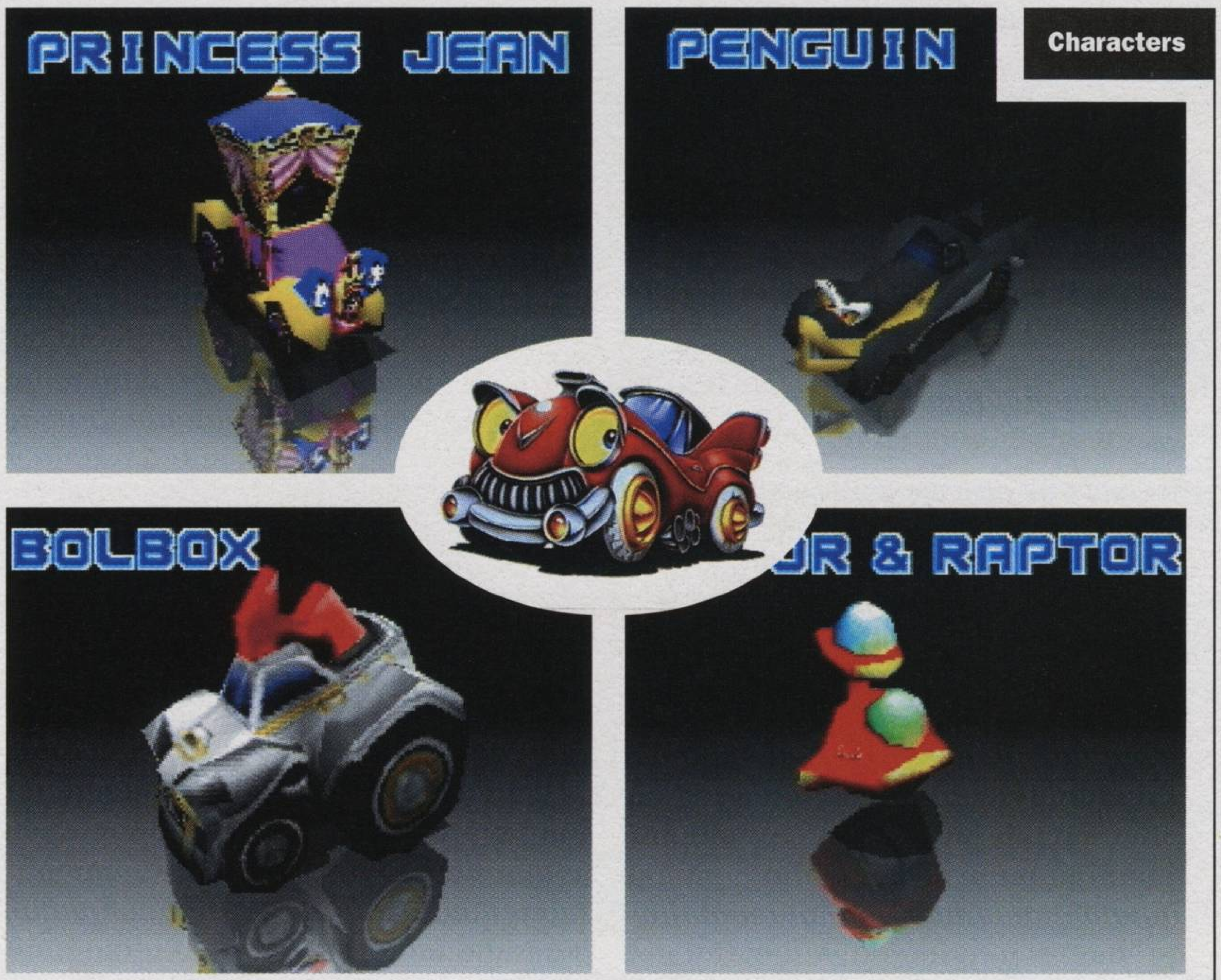
testscreen



The cars and characters in *Motor Toon* were designed by Japanese artist Susuma Matsushita. His original airbrush designs (centre) have been ably converted into texture-mapped 3D

At the start of each race your character spins down out of the sky before turning into a car

Continued

the same car is plain dim. For instance, anyone choosing Captain Rock over Bolbox will win. Simple as that.

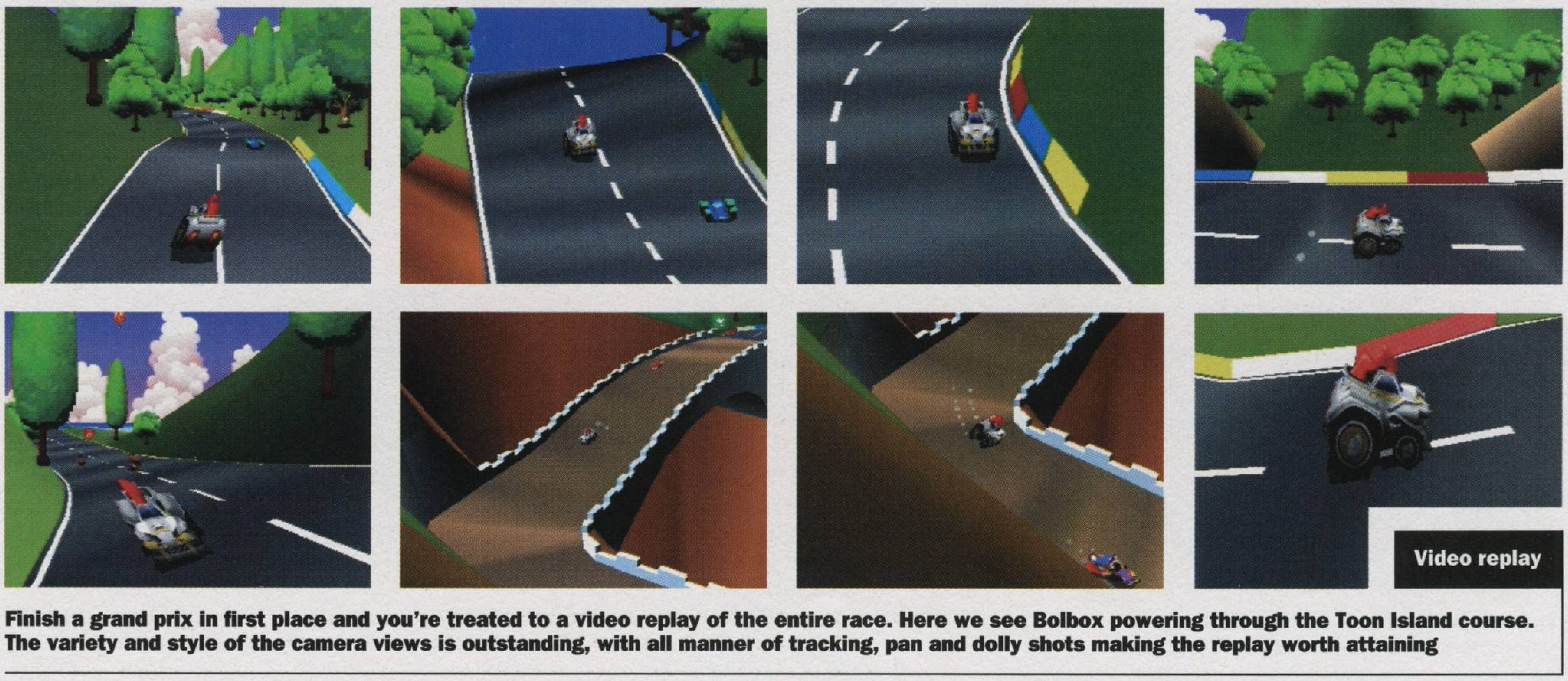
And this disparity in the strengths of the various cars means that later courses can only be beaten with certain vehicles, which rather erodes the point of having different characters in the first place.

Motor Toon has several other annoying traits which prevent it from becoming a classic. Each of the cars has its own peculiar handling properties, whether it's cornering, top speed or whatever. But they all have a disturbing tendency to get stuck against walls. Fail to make a sharp corner and your vehicle runs headlong into the wall, rebounds slightly and stops. But it never rebounds far enough for you to turn sharply and carry on racing; even with full lock on, you run into the wall again. To continue, you either have to turn in the opposite direction and do a full 360-degree manoeuvre or execute a three-point turn. Either way, enough time is wasted to ensure a low position in the final rankings.

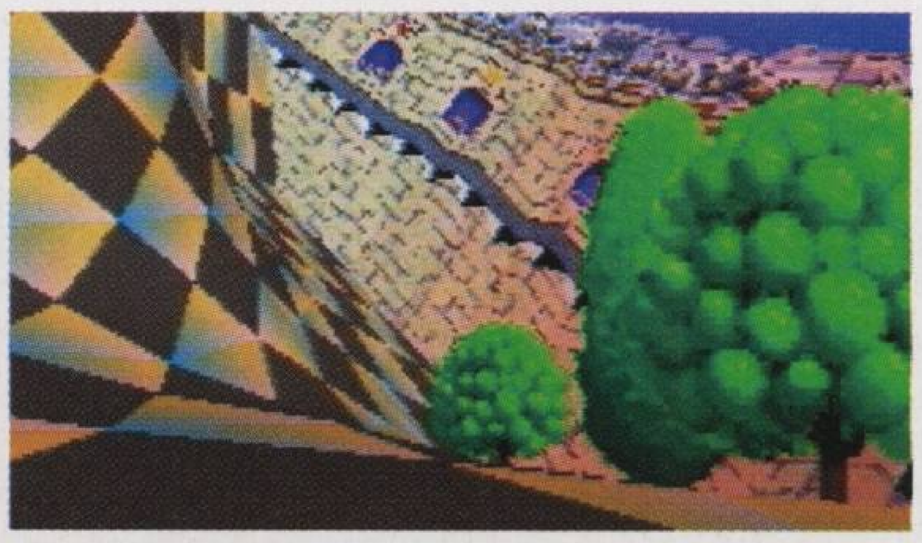
A similarly irritating flaw is the fact that there's no guide to where you are in relation to the other racers. Unless you can actually see the car in front, there's always a nagging feeling that you're the only one on the course. This means that you never really know how well you're doing until it's all over.

In short, the odd foibles of *Motor Toon GP* and the unnatural way in which the cars handle means that the game falls well short of *Ridge Racer* in terms of challenge and excitement. PlayStation owners gagging for new software won't be too disappointed, but discerning gamers might do well to grit their teeth and wait a few weeks for the next wave of software.

Edge rating: **Six** out of **ten**

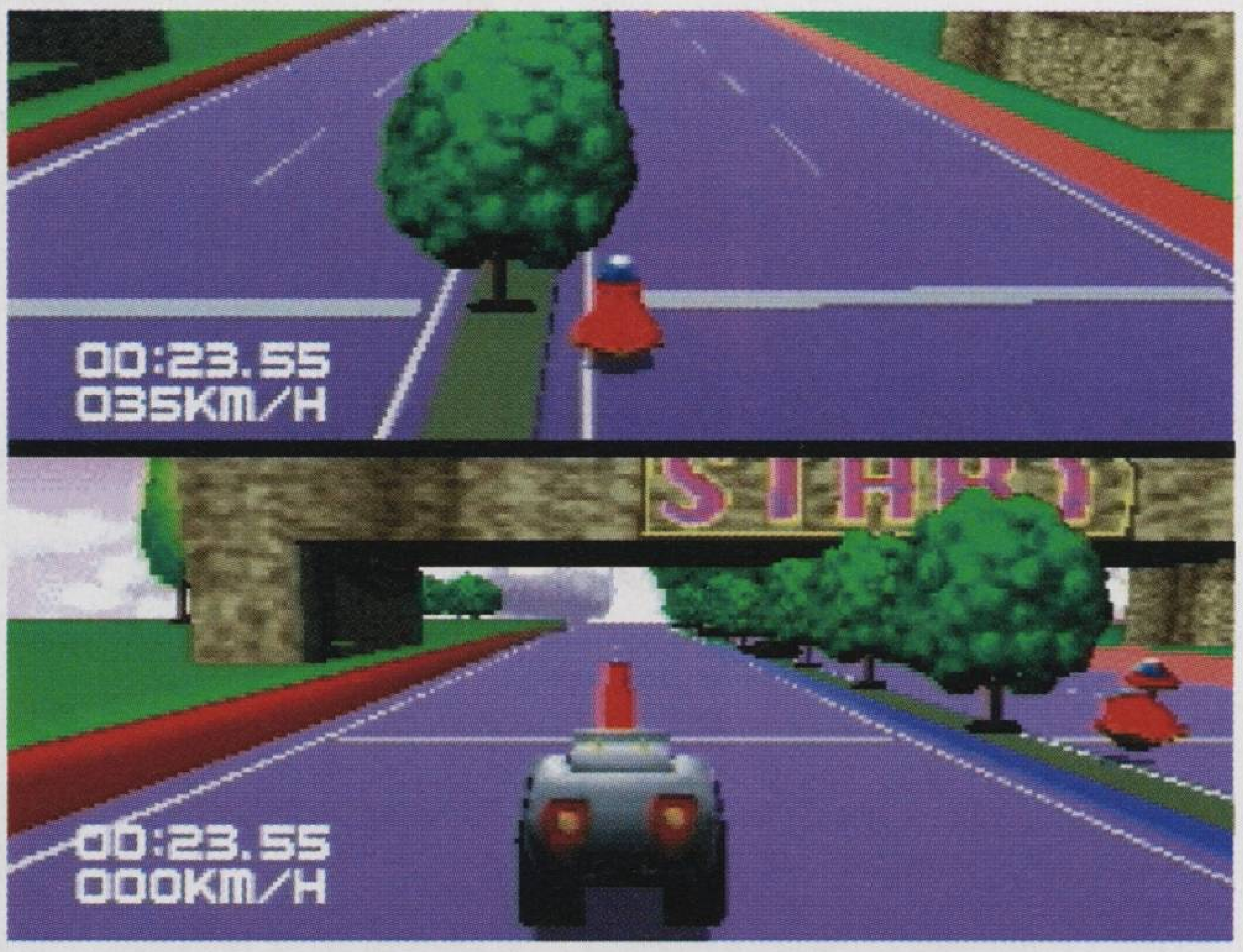


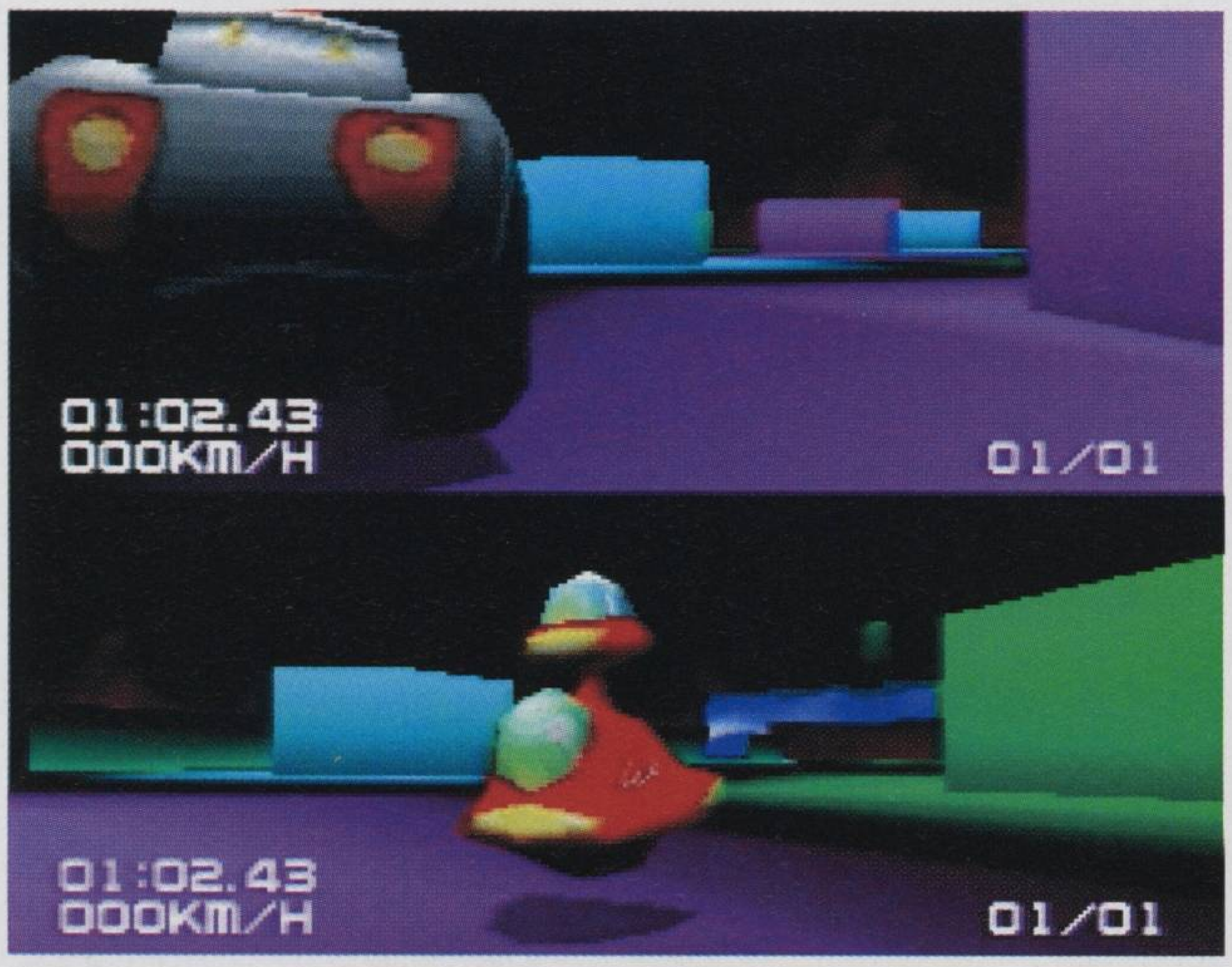
Finish a grand prix in first place and you're treated to a video replay of the entire race. Here we see Bolbox powering through the Toon Island course. The variety and style of the camera views is outstanding, with all manner of tracking, pan and dolly shots making the replay worth attaining



If nothing else, *Motor Toon* is *weird*. The Plastic Lake course is a heady mixture of colours, Gouraud shading and drugs

Race options





The four main race options in *Motor Toon* are Grand Prix (top left), Dual Race (top right), Match Race (bottom left) and Time Attack. The difference between Dual and Match races is that you race against another person either on the same course or on parallel courses. Time Attack has you racing against your best time, in the form of a duplicate car

Bolbox the robot tramples through the forest on his way to winning the race (right). Sadly, the ability to change from car to char is both random and pointless

testscreen

Alone In The Dark 3

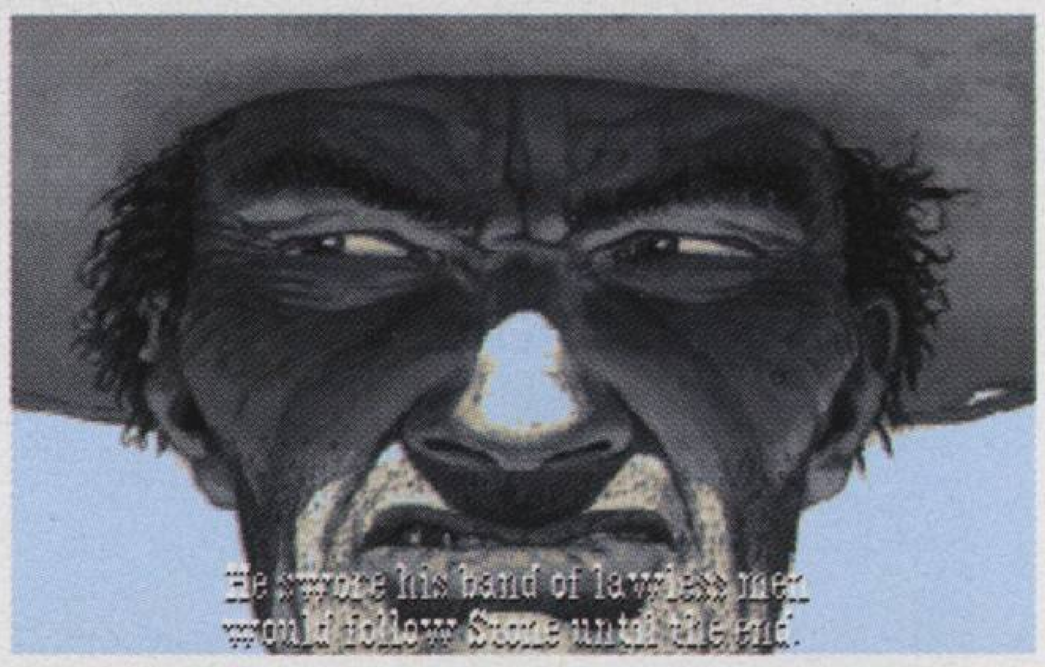
Format:	PC CD-ROM
Publisher:	Infogrames
Developer:	In-house
Price:	£45
Release:	February 5

AITD3 has the same stylish camera angles as its forerunners but dispenses with the awkward views

Dismantle the ring (top), spot the squinting dragon (middle) and collect your goods from its mouth

For a series that has done little new in the three years since its first, revolutionary, incarnation, *Alone In The Dark* has remained remarkably popular. The latest version, *Alone In The Dark 3*, attempts to marry the intense atmosphere of the original with the scale and challenge of the sequel to produce the definitive polygon adventure game.

Infogrames obviously decided at an early stage not to depart into the unknown for *AITD3*. The most noticeable changes are the addition of several polygons to Carnby, the game's hero, and the inclusion of difficulty settings to appease novices. Both are welcome, but as Carnby still looks like a polygon artist's hatchet job and the ramped levels fail to disguise some of the game's more frustrating aspects, the tried and tested formula remains unenhanced.

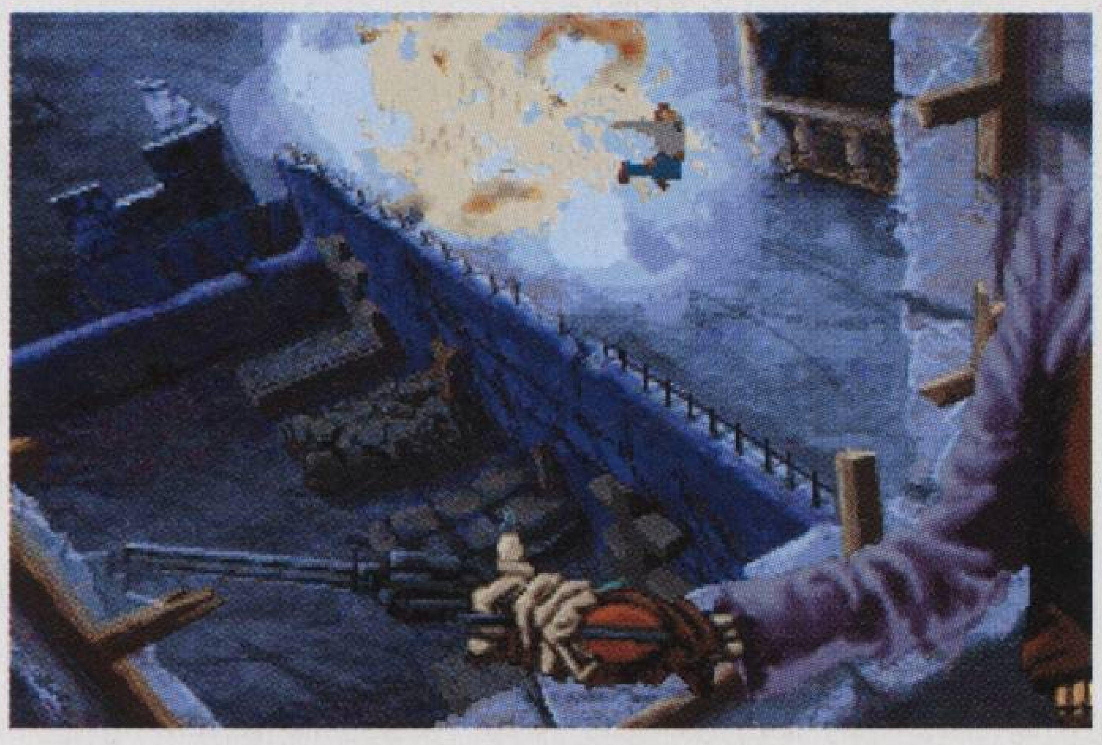


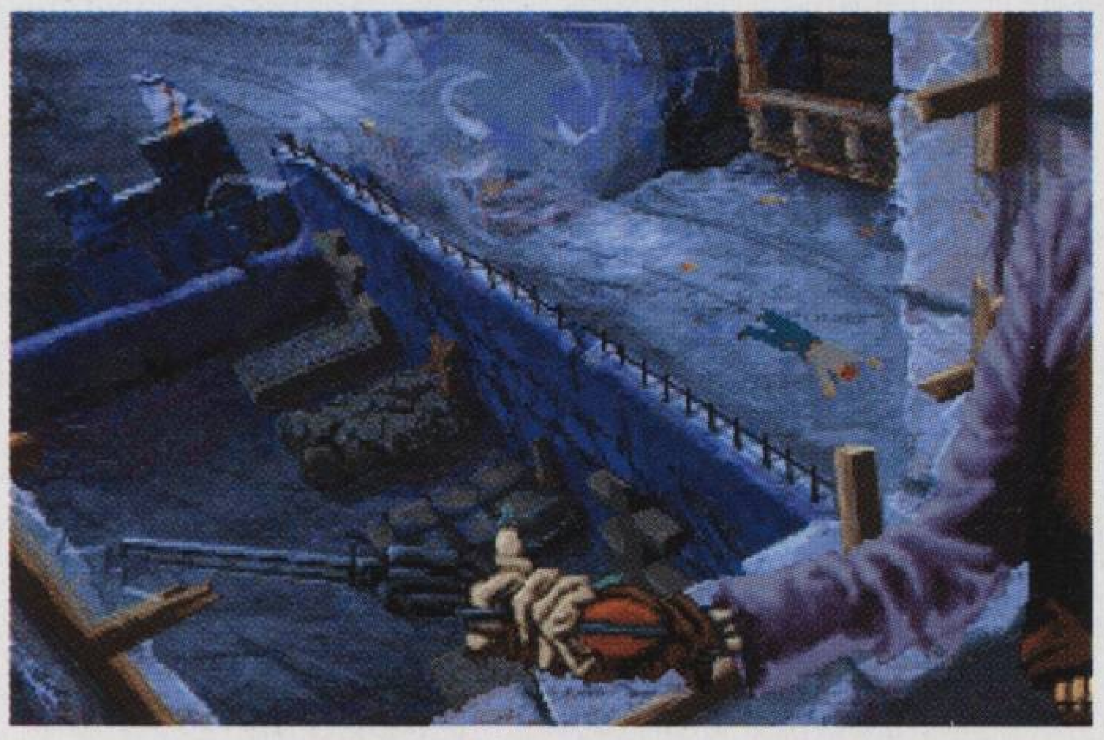
The story is advanced by cut-scenes (top). Carnby is transformed into a cougar (above)

The main focus of the *AITD3* development team was the game's plot, with continuity and background detail taking top priority. The results are impressive. The game takes place in 1925 on an abandoned film set, located in a goldrush ghost town on the San Andreas fault inhabited by zombies and Indian witchdoctors. This provides plenty of potential for story development, with diaries, posters and film snippets all contributing to the twists and turns of the scenario.

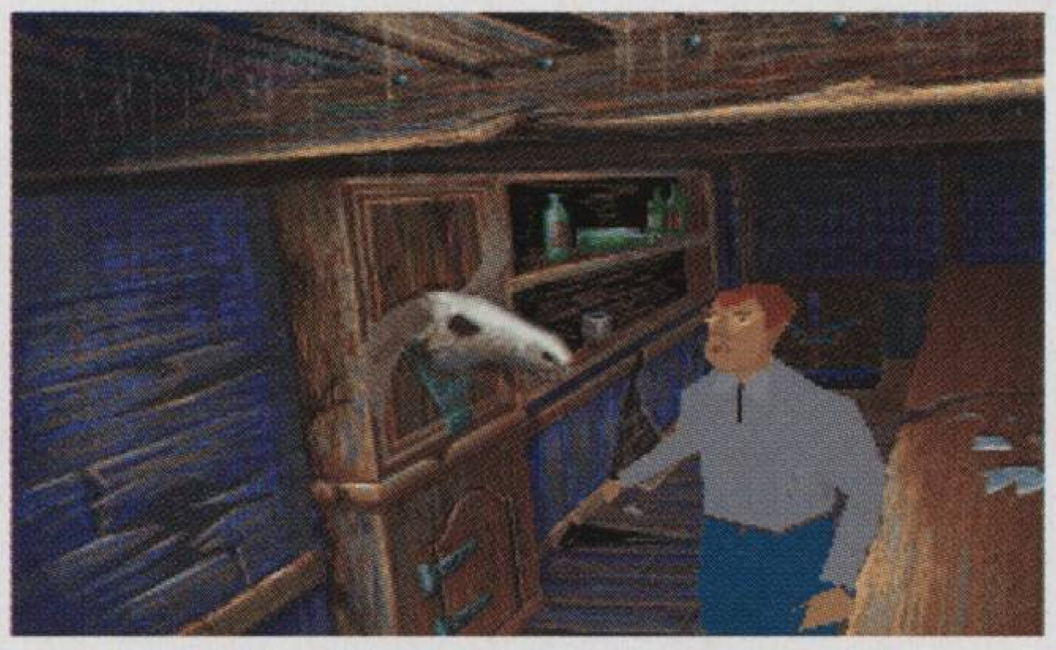
The plot allows a unique atmosphere to be developed, and *AITD3*, like its predecessors, takes full advantage of the opportunity. The spooky music, punctuated by echoey sound effects and sudden, reverberating gunshots, creates an air of constant tension that makes playing an intense experience.

Intro





As you enter Slaughter Gulch, a fiery arrow streaks towards the bridge (top), blowing it up (middle) and hurling you into the ghost town (bottom)



Pagan rites are enacted when you die (top). Carnby looks blocky (middle), but the plot keeps you coming back for more (bottom)

This bar is the first room you encounter. Your initial task is ridiculously obscure (hint: look behind the piano)

Unfortunately, at times the game can also be highly annoying. The criticism that *Alone 1* was too simple has obviously been taken to heart, and the result is a collection of the most obscure puzzles any videogame has ever concocted. At the very start of your task you have to enter a bar, find an ordinary bottle, smash it against a wall, retrieve a 'token' and pop it into an obscured section of the bar piano. The reward is a short story and the mysterious appearance of a hitherto invisible oil lamp. Although this is an extreme example and no-one wants easy puzzles, some sense of logical progression would be appreciated.

Another irritation, albeit one that the game only suffers from intermittently, is the collision detection. Not only is Carnby not the most responsive of characters at the best of times, but platforms tend to lose their solidity just as you're about to land, and you rapidly become tired of restoring saved games. (*AITD3* does include multiple save files, though, which enable you to chart your progress.)

Polygons were once *AITD*'s greatest strength but, with technology advancing and titles such as *Ecstatica* and *Little Big Adventure* now the state of the art, those same polygons have become the game's most unoriginal aspect. The backgrounds are excellent but the blockiness of the characters detracts from the overall realism. And although the atmosphere is appropriately menacing, the irritation caused by the excessively cryptic puzzles will tend to put newcomers off. Still, *AITD4*, complete with realtime 3D backgrounds, is on the way...

Edge rating: **Seven** out of **ten**

Samurai Shodown II

Format:	Neo-Geo CD
Publisher:	SNK
Developer:	In-house
Price:	£60
Release:	Out now (Jap)

In early 1993, when Capcom's grip on the beat 'em up seemed unshakable, SNK released a game that was destined to challenge *Street Fighter II*'s dominance. The game was *Samurai Shodown*, and its quality can be attributed primarily to one factor: it was developed by ex-*SFII* staff who had defected to SNK from Capcom's in-house arcade team.

It was the differences between *Samurai Shodown* and *SFII* that ensured it a loyal following. While a plethora of clones merely copied *SFII*'s martial arts-based action, SNK's game was based on various forms of weaponry. Weapons could be locked between characters and some fighters could even use their blades for projectile attacks.

The game offers a nationality select among its options (the US version features green blood)

Another notable feature was the inclusion of collectibles, an idea previously unheard of in the beat 'em up genre. Mid-bout, chicken portions, cash bonuses and bombs would be lobbed into the fighting arena. Ideas like this, although initially unwieldy in practice, were to prove almost as important a part of beat 'em up lore as the Dragon Punch.

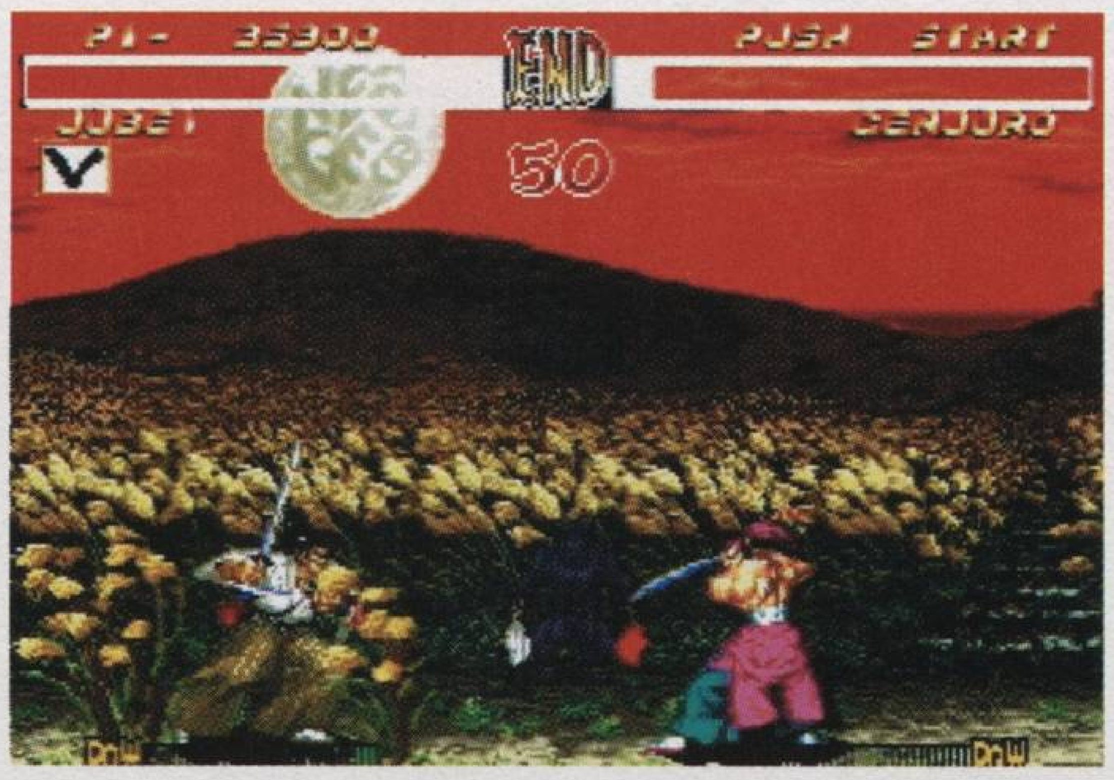
And, unsurprisingly, they're retained in *Samurai Shodown II*. However, major innovations are thin on the ground. There's only one real addition to the gameplay, and that seems rather superfluous. As well as the established quick retreat and advance moves, the game now offers the ability to lie almost flat during battle via a double click in the down direction on the pad. Unfortunately, unlike the new ability to dodge an attack in *The King Of Fighters '94*, this proves to be all but redundant in practice.

The number of selectable characters has been upped to 15, with the backdrops of existing characters enjoying a fresh lick of

Wan-fu prepares to drop on to his poor opponent (top). A red Earthquake demonstrates the new 'lie' move (above)

Sieger hails from Germany and, although slow, is one of the most powerful characters in the game

Players familiar with the original game will find some old favourites in *Samurai Shodown 2*



The character select screen offers a complement of 15 combatants (top). Galford launches a spectacular aerial attack on Sieger (above)

Although not quite up to *The King Of Fighters '94* standards, *Shodown*'s backdrops still impress (top). Note the POW meter special move info (inset). Yet another violent exchange (above)

paint. The new fighters include Sieger, a partially armoured warrior with huge forearms, and the decidedly doddery Nicotine, an ageing fighter who, although blessed with obvious mystical properties, is pretty much useless against just about every other character.

The only other changes are largely cosmetic. Now when the POW meter reaches maximum the screen actually displays the super special move pad movements – a thoughtful addition. The loading system also benefits from a swipe with SNK's polishing duster. While all Neo-Geo CD releases so far have used the machine's built-in juggling monkey hardware loading routine, *Samurai Shodown II* applies its own from software. As it loads the game, the system flicks through Japanese-style SD (super deformed) character images cut into two sections. All this seems to be entirely irrelevant until you discover the in-game cheat which actually allows you to fight using the characters in their super deformed guises.

In terms of sound – an angle much emphasised by SNK in its marketing of the Neo-Geo CD – *Samurai Shodown II* continues the push towards memorable tunes, although some will no doubt find the game's countless pipe-laden tracks too laid-back for the upbeat gameplay. The tunes that do hit the mark are stupendous, but repeated listening to certain ones, however technically accomplished they may be, can become a real test of endurance.

SNK has exploited the current lack of a true successor to Capcom's *Street Fighter II* and nipped in with a game that takes its beat 'em up craft a small but significant step further. Since its recent arcade launch, the game has garnered an impressively large and loyal following, proving that beat 'em ups are still, after dedicated cabinets, the most popular game genre in coin-op circles. In the home, it will serve to ensure that the Neo-Geo CD is classed as a serious contender in the next-generation console arena.

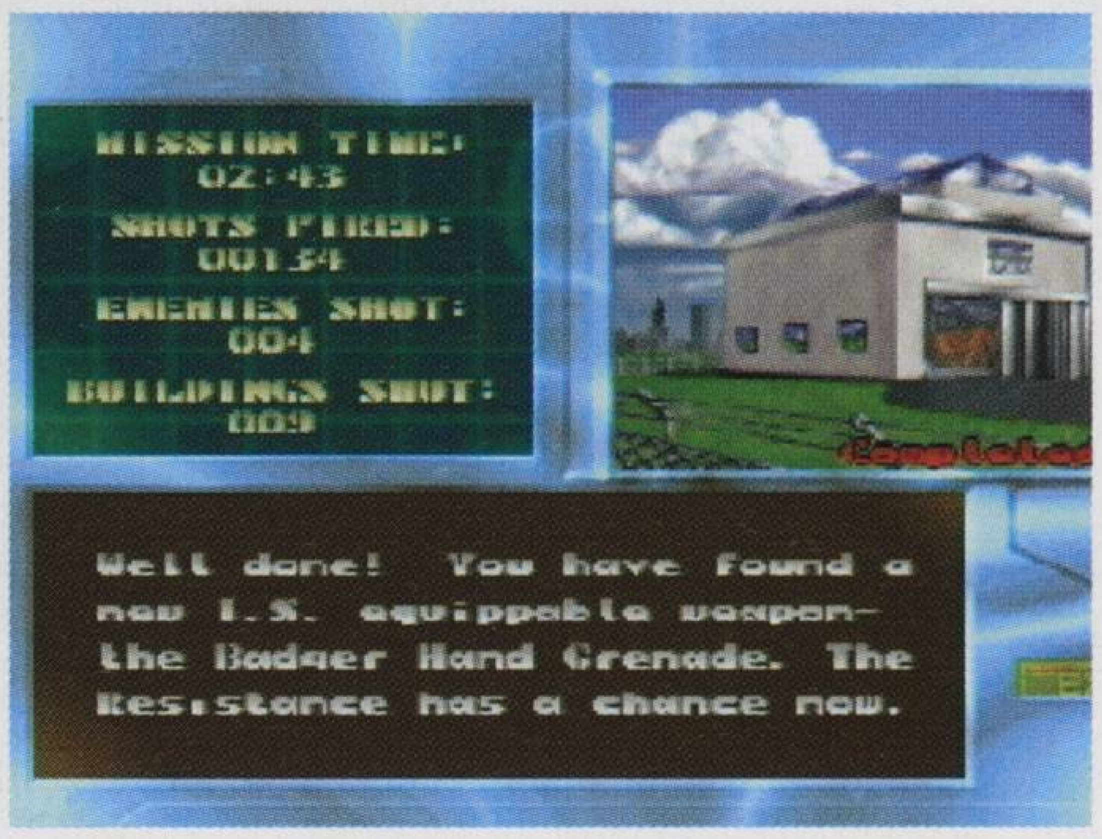
The POW meter special moves have remained largely unchanged and are still as lethal as ever

Edge rating: **Eight** out of **ten**

Computer-controlled characters have an uncanny ability to avoid projectiles (top). Wan-Fu's flaming punch owes much to *SFII* (above)

Iron Soldier

Format: Jaguar
Publisher: Atari
Developer: Eclipse
Price: £55
Release: Out now (UK)



A skyscraper becomes a groundhugger as you lob a hand grenade into its base (left). After completing some of the harder missions, you get new weapons to help you in future battles (right)

As the horde of Jaguar games promised for late summer finally sees daylight, only one turns out to have been worth the wait. *Iron Soldier* is one of the few Jaguar titles this year which deserves success.

Refreshingly, this is a game built on the traditional virtues of solid graphics and strong gameplay. Roaming about in your giant robot, shooting anything that moves, razing skyscrapers to the ground and watching the spectacular explosions consume anything within their blast radius is mighty good fun.

Although the game seems a bit lumbering at times, its lack of pace is compensated for by the variety of missions and foes. Each mission is tailored to provide a specific challenge and all are highly taxing on the top difficulty setting. While the scenarios all, inevitably, revolve around the destruction of enemy craft and installations, there's enough variety to keep you coming back for more.

Iron Soldier is a superb combination of Amiga-style gameplay and Jaguar visuals. It may not be the fastest beast on two legs (and the lack of texture mapping often makes the visuals look dowdy) but the playability lurking beneath the surface offers a challenge matched by few other Jag games.

Edge rating: **Eight** out of **ten**

A grenade cluster explodes (top left). Fly a cruise missile in later missions (middle left). Blocks crash around you (main). Enemy mechs (above) are by far the toughest opponents – use grenades

Edge recalls another time-served title that has undisputedly earned the right to be included in the roll-call of classic videogames

Marble Madness

The 3D isometric view provided incredibly rich and detailed landscapes (above). The marble is catapulted over to the black ball (above right)

Format:	Amiga
Publisher:	EA
Developer:	Larry Reed
Price:	£20
Players:	1 or 2
Released:	1986

The final level (above) was the hardest, but the entire game could still be completed in five minutes. Navigating this undulating path (right) provided a short cut to the goal

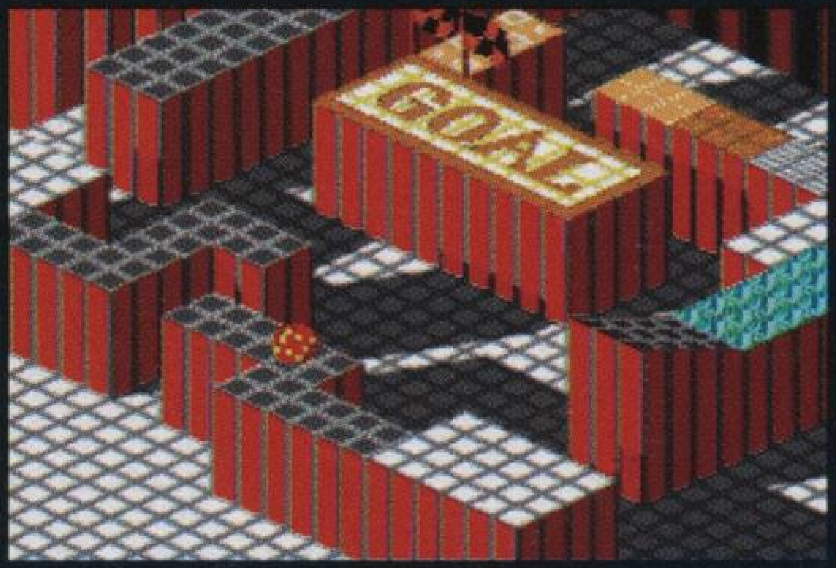
The legendary *Marble Madness* is a prime example of Atari's ability to create original videogames. First released in arcades over ten years ago, it initially had a mixed reaction, primarily because of its unusual controls – like other Atari titles, *Marble Madness* used a trackball. The object of the game was to guide a marble (or two if a twoplayer game was selected) through a maze of undulating levels within a set time limit. The skill required to guide your marble through the tortuous mazes was considerable, and only those brave enough to try something truly different were seduced by the game's abundant charms.

Marble Madness was one of the first games to be converted especially for the Amiga, being released on the A1000 back in 1986. Until then, few titles made full use of the Amiga's 32-colour palette, and even now *Marble Madness*'s isometric perspective looks impressively detailed. It was only the bumbling tunes – which sounded like an Amiga emulating a Commodore 64 – that let the whole package down.

Like the great Atari coin-ops which followed (*Paperboy*, *720°*, *APB* and *Toobin'*), *Marble Madness* has since become regarded as part of a golden age of videogaming. It was released at a time when there were no end-of-level bosses and no special features (apart from extra grip on the tracks); straightforward playability was the order of the day, and the rewards were ample bonuses and entertaining visuals.

The imagination that went into the design of both the levels and your adversaries is typical of the flair that Atari Games exhibited in the 1980s. If only the Jaguar could rely on the talent that Atari's coin-op division once so amply demonstrated.

***Marble Madness*'s 3D visuals featured some remarkable Escher-type effects**



In one level the ball rolled uphill (middle). Vanishing blocks (above)

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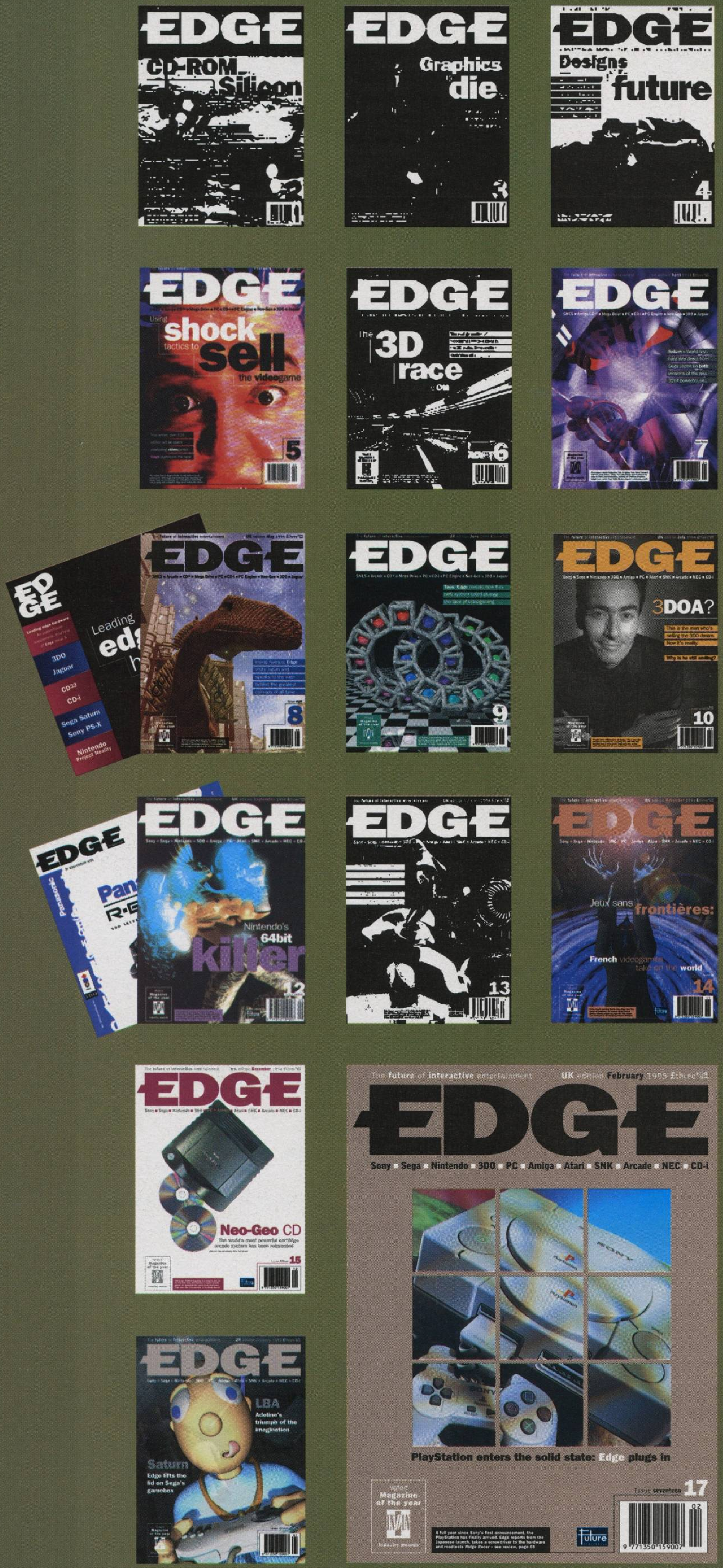

Edge 17
PlayStation: it's here. **Edge** playtests the machine that marks Sony's entry into the games hardware market. **Getting wired up:** the home entertainment revolution. **Previews:** *Tohshinden* (PlayStation), *Motor Toon GP* (PlayStation) and many more. **Reviews:** *Ridge Racer* (PlayStation); *Virtua Fighter* (Saturn); *Transport Tycoon* (PC); *King Of Fighters* (Neo-Geo CD); *Creature Shock* (PC); *Super SFII X* (3DO); *Samurai Shodown* (3DO)

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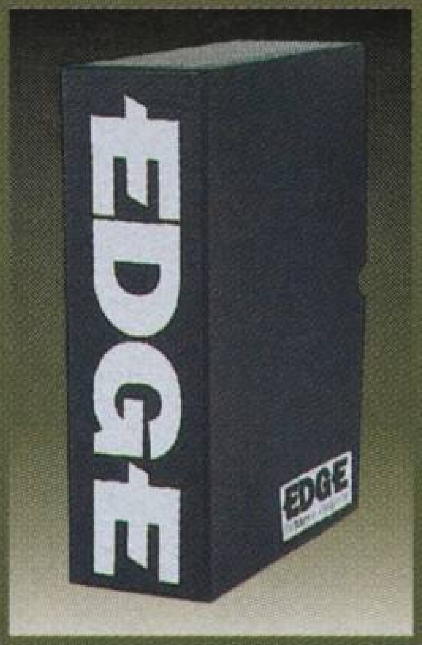

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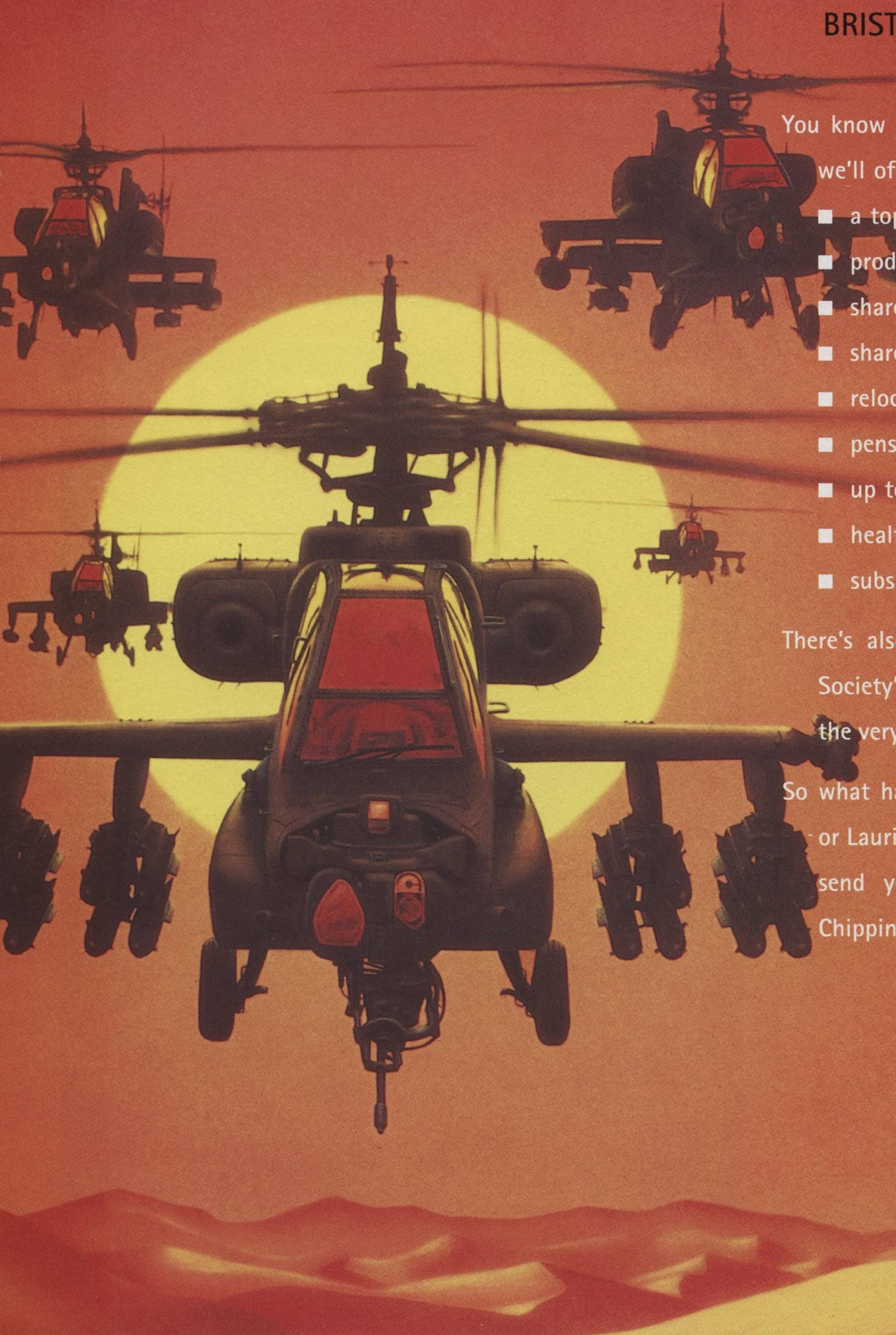

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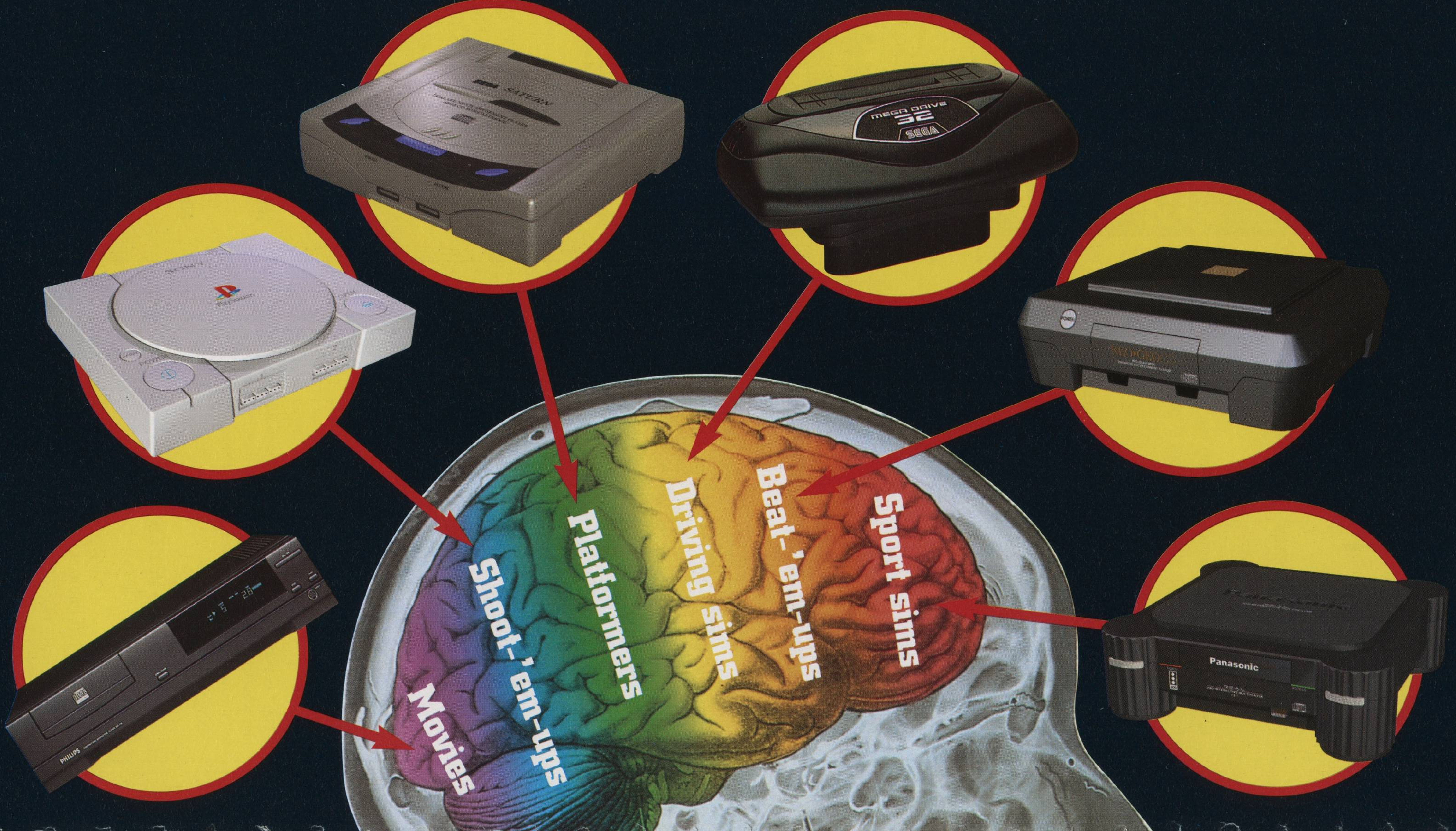

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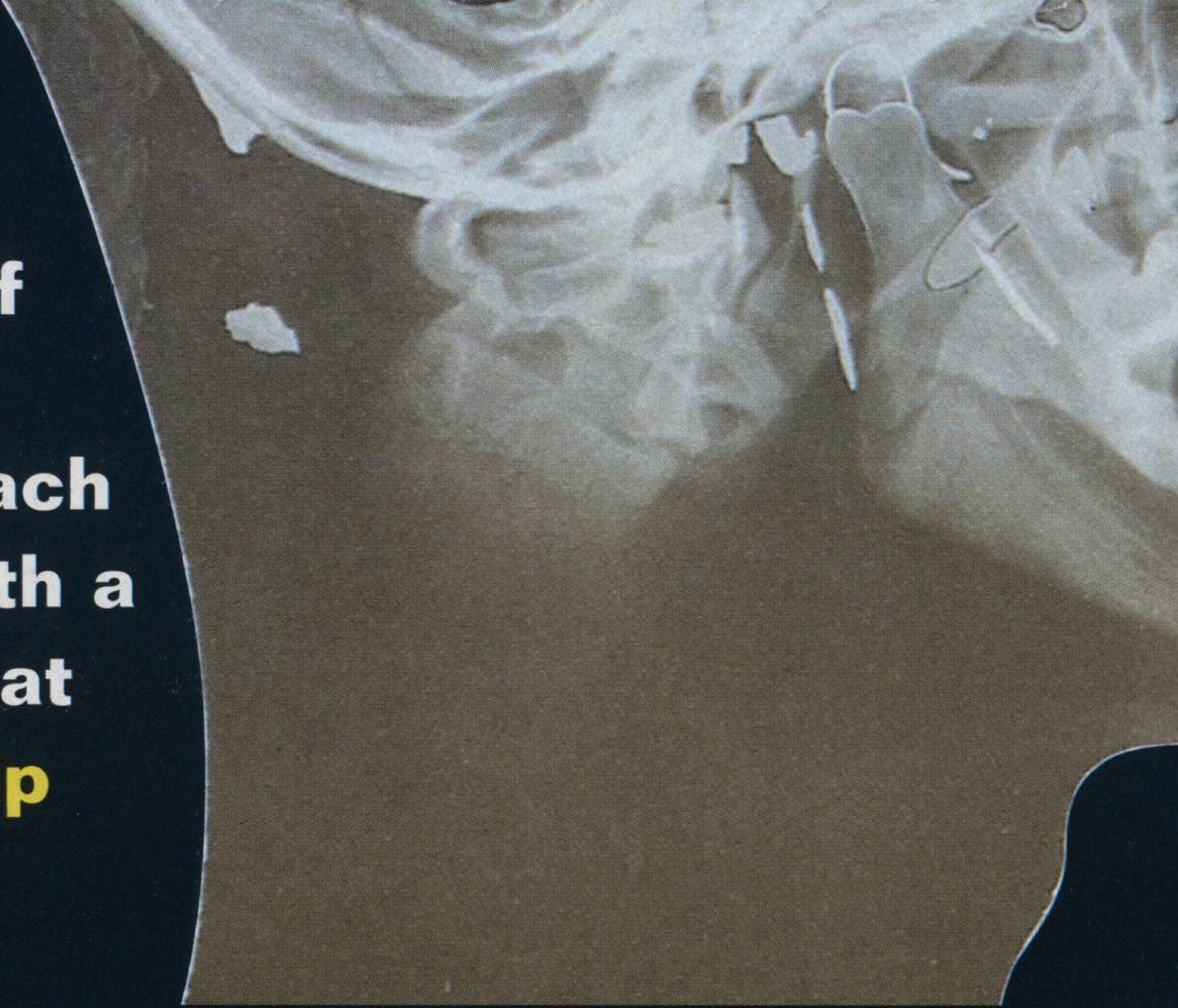

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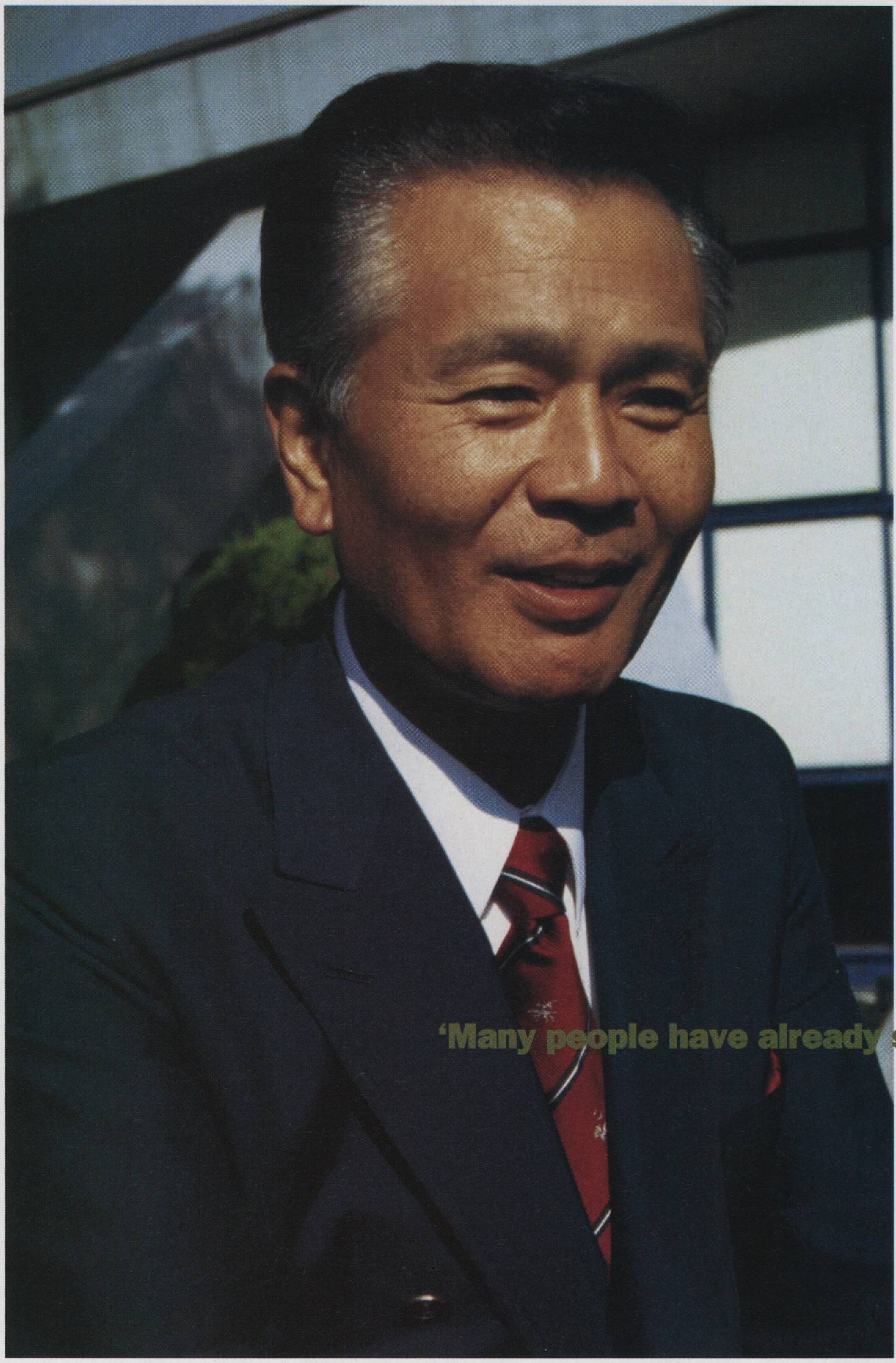


Photographs: Kiiye

'Many people have already said that they can't understand

An **audience** with… Gumpei Yokoi

Nintendo's hardware guru and the designer of the Game Boy talks to **Edge** about the latest addition to his portfolio, the much maligned Virtual Boy

In 1969, Gumpei Yokoi was a young electronics graduate looking for a job in his home town of Kyoto. He was taken on by Nintendo as a factory maintenance engineer at the time when the company still specialised in the manufacture of Japanese *hanafuda* playing cards. Soon the Nintendo chairman, Hiroshi Yamauchi, recognised his creative flair – Yokoi was an electronics tinkerer who was forever knocking up gadgets out of spare parts – and moved him into a new division set up to create games and toys.

Yokoi's first project was the Ultra Hand, a extending-arm toy that sold 1.2 million units on its launch in 1970. After several other successful toys, including a baseball pitching machine, a periscope, and even a 'love tester' for teenage couples, Yokoi started to concentrate on electronics. What followed was the phenomenally successful Game And Watch and, several years later, the Game Boy.

Edge spoke to Gumpei Yokoi at the recent Shoshinkai show in Chiba, Japan, where his latest creation, the infamous Virtual Boy, was unveiled to a less than impressed games industry.

Edge Just how important is the Virtual Boy to Nintendo?

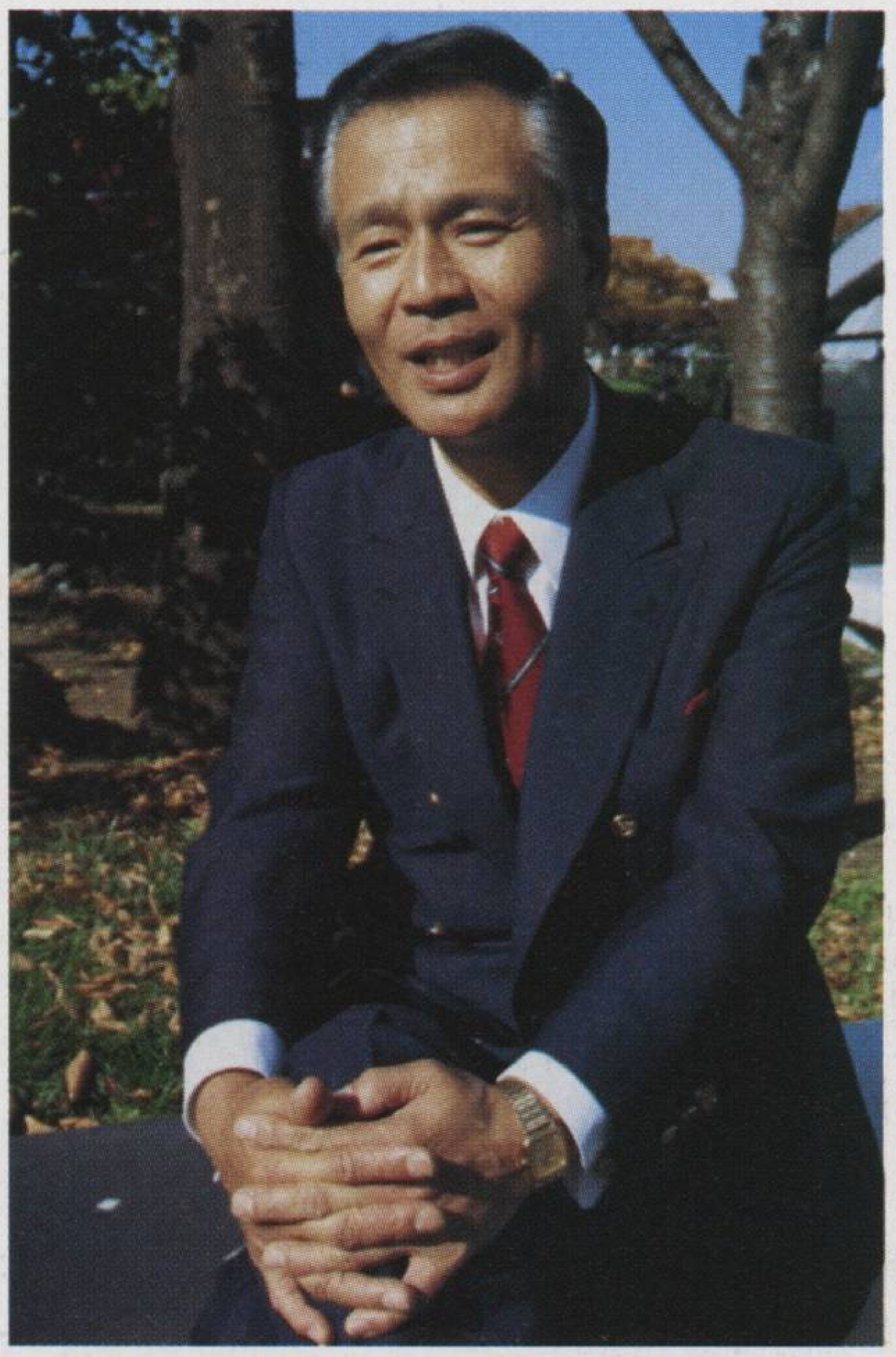
Gumpei It really is a very big project, partly because it will be the first product of its type to reach the market and uses very sophisticated technology. We are even telling the Japanese press that we will achieve three million hardware sales in its first year onsale in Japan. At the moment we only have plans for its release in Japan.

Edge Is it Nintendo's next Game Boy?

Gumpei Yes, in some ways. But we expect both the Game Boy and Virtual Boy to co-exist alongside each other rather than the Virtual Boy being a replacement.

Edge When did the development of the Virtual Boy begin and how many engineers are working on the project?

Gumpei There are four R&D groups within Nintendo, and my department [R&D1] has about 60 people working specifically on the Virtual Boy. Before this, we worked on numerous projects including the Game Boy, and also software for the Famicom and Super Famicom such as the *Metroid* series. Other departments – R&D3, for example – are working on the Ultra 64 [under Ultra 64 project leader Genyo Takeda, and in close cooperation with Silicon Graphics in the USA].



the difference between the next-generation machines and the 16bit machines'

Edge When was the deal with Reflection Technologies tied?

Gumpei They approached us about three years ago, but they didn't have any specific end-product in mind. So we hit upon the idea of utilising two separated screens to make a 3D display.

Edge Did you look at many other forms of technology before deciding on LED?

Gumpei Our first decision was to make use of virtual reality-type technology. From there, we thought about many concepts as display apparatus, including LCD devices.

Edge Most people who've seen the Virtual Boy in action are disappointed by its performance. Just how happy is Nintendo with the initial Virtual Boy software lineup?

Gumpei I think that the most important point is to show the general public and thirdparty developers what kind of functions the Virtual Boy has. The initial lineup does that, although it's worth pointing out that it's not yet final.

Edge Some of the early Virtual Boy software looks distinctly 2D. Is it fully realising the power of the 32bit processor?

Gumpei The machine is running two displays simultaneously, obviously with two different images, and they have to be synchronised. That's why we need such a powerful CPU – it's effectively doing twice as much work as a conventional videogames system.

Edge How many thirdparty licensees have you got signed up?

Gumpei We haven't been eager to show the technology to many thirdparties. We've limited it to only a couple up until now, although every developer was shown the product at Shoshinkai, and any interested will be given full product specs and the tools they'll need to develop for it. I believe that there will be a significant number of licensees interested in working on the Virtual Boy.

Edge Why have so few licensees been shown the technology before now?

Gumpei This particular strategy was dictated by Nintendo's president, Hiroshi Yamauchi. The main reason is that if we are going to allow any software publisher to develop games for our platform, there's a danger that poor-quality software will appear. So we wanted to limit that danger and maintain as much control as possible.

Edge Do you have any plans for polygon-based titles or games with other types of 3D environment?

Continued next page

interview

Gumpei Yes, polygon-based games are included in our plans, although I can't announce anything just yet. At Nintendo we have been extensively testing polygon software on the system, and thirdparties will no doubt be using their own techniques to develop polygon games. [It's known that Hudson Soft has a polygon shoot 'em up in development for the Virtual Boy.]

Edge What do you think will be the most common type of game to appear on the Virtual Boy?

Gumpei Personally, I think that it will be most suited to action and puzzle games, but in the future RPGs and simulations will become popular. [Nintendo loyalist and RPG specialist Square Soft is the only other thirdparty to have been announced.]

Edge What are your plans regarding further software releases?

Gumpei About one title per month will be released immediately after the machine's launch, but that will obviously increase as time goes on.

Edge Has Mr Miyamoto been involved in any software development?

Gumpei Not at this stage, no.

Edge Is Nintendo worried about the potential physical dangers of true virtual reality, using head-mounted displays? Wasn't the Virtual Boy originally going to use a head-mounted display…

Gumpei No, we didn't think that a head-mounted display would be necessary for a virtual reality system that doesn't use any kind of motion tracking facility. We are worried about the possible dangers of HMD technology, but we also considered the fact that if a woman wearing make-up was to use the head-mounted design, the next person might be hesitant in wearing it! So we changed the design so that you can just look into the viewing apparatus and still appreciate the 3D experience. The standard format was shown at the Shoshinkai show, but we have plans for a shoulder-mount adaptor so you won't need a table or desktop to use the system.

Edge And this attachment will appear with the machine…

Gumpei No, it will have to be bought separately.

Edge So what will buyers get with the system when it goes onsale?

Gumpei The stand, the main unit, the controller and the battery box that will be slotted into the controller.

Edge The demonstration machines at the Shoshinkai were running from AC adaptors. Will that be the machine's primary power source?

Gumpei No, it's a battery-operated machine. It uses six AA batteries which last for around seven hours. An AC adaptor will go onsale separately at the same time as the system.

Edge Since the Virtual Boy uses cartridges, what size will most of the games be?

Gumpei Eight megabits will be the initial standard for most games, although 16-megabit and 24-megabit titles are feasible and will most likely appear at a later date.

Edge Is there anything else you can reveal about the hardware?

Gumpei Sorry, I'm not in a position to give you details at the moment – only thirdparty publishers that are currently signed up have that information.

Edge Are you currently working on any other hardware projects at Nintendo – such as Ultra 64 development, for example?

Gumpei At this stage I'm only working on Virtual Boy. We [R&D1] aren't involved with the development of the Ultra 64 hardware – that's being handled in the US by Silicon Graphics and also R&D3.

Edge Isn't Nintendo worried about the arrival of Sega and Sony in the market with what could be very successful machines? How do you feel about the Ultra 64 arriving almost a year later?

Gumpei When we started work on the Virtual Boy it was at a time when the Super Famicom was booming, but we still had doubts as to how long it would take before the general public would eventually get bored with a traditional display. So we came up with the idea of a 3D image project. Now we are showing a product that coincides with the release of the PlayStation and Saturn. And I think that what we originally thought was right, because many people who have seen the demonstrations of these so-called next-generation machines have already said that they just can't understand what the difference is between them and the 16bit machines. Therefore, I think that the Virtual Boy will prove very important in this respect.

The Virtual Boy will be released in Japan in April for ¥19,800 (£127), and in the US at the same time. Three games will be available at launch.

'We are telling the Japanese press that we will achieve three million hardware sales in the first year onsale in Japan'

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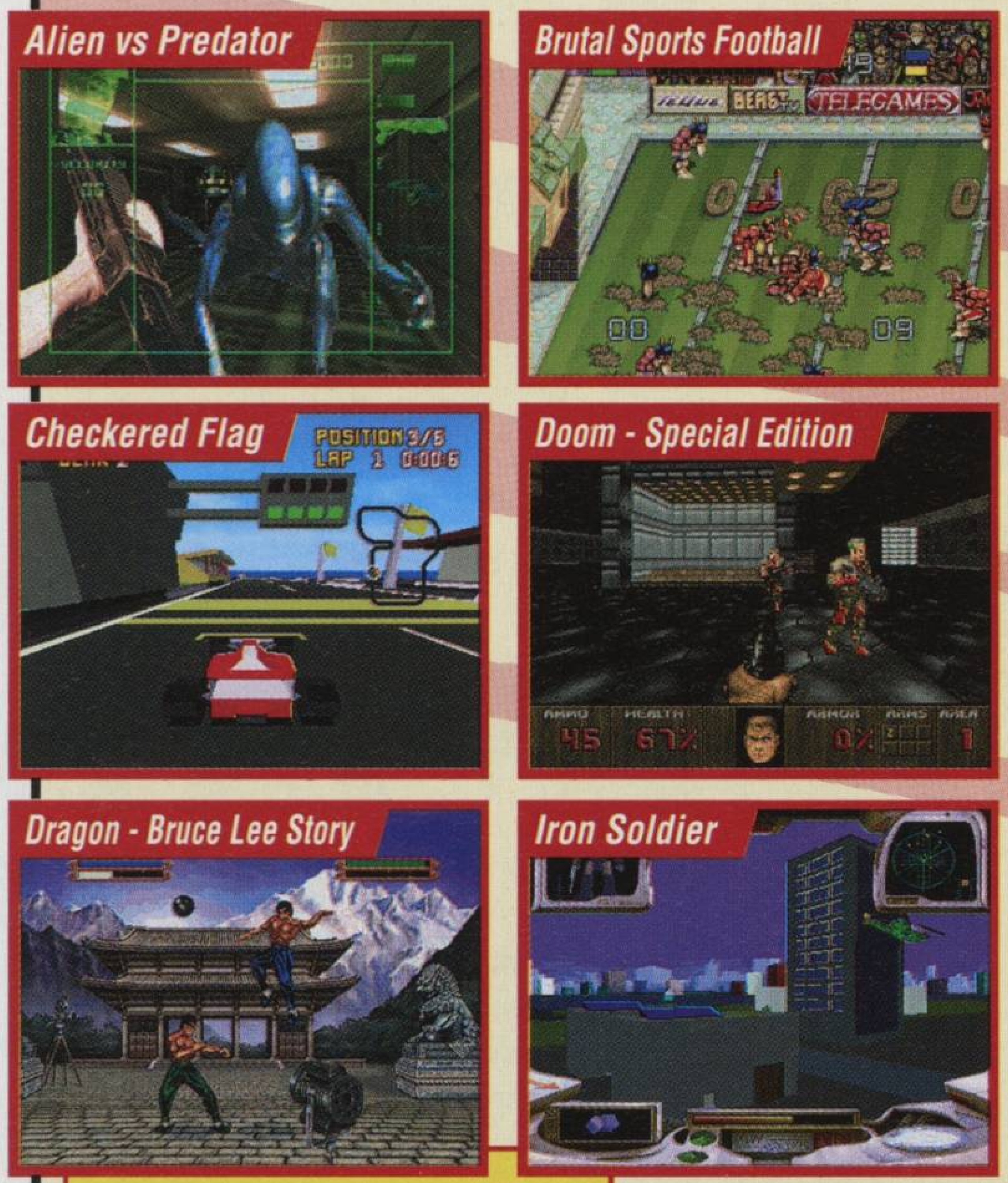

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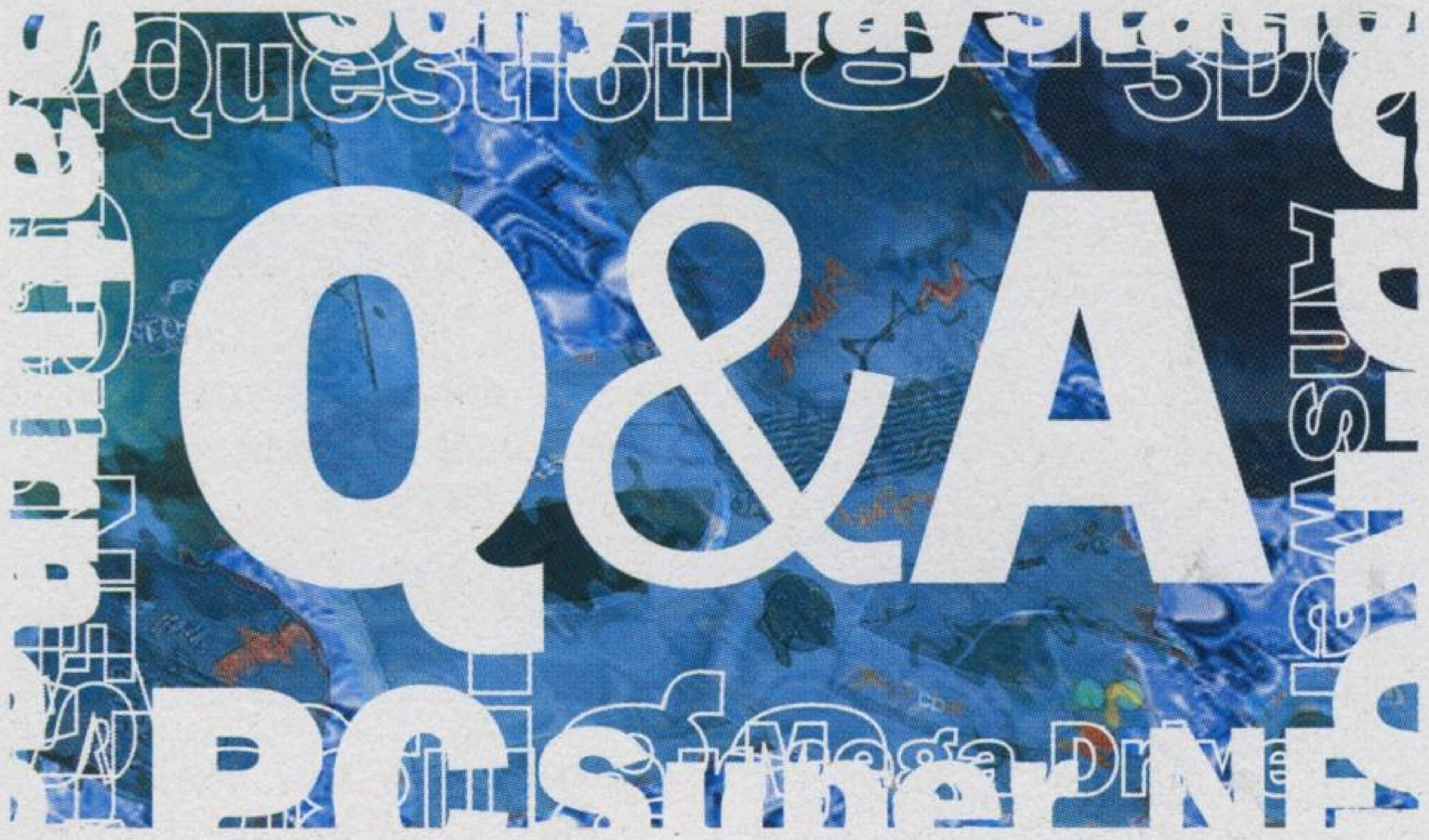
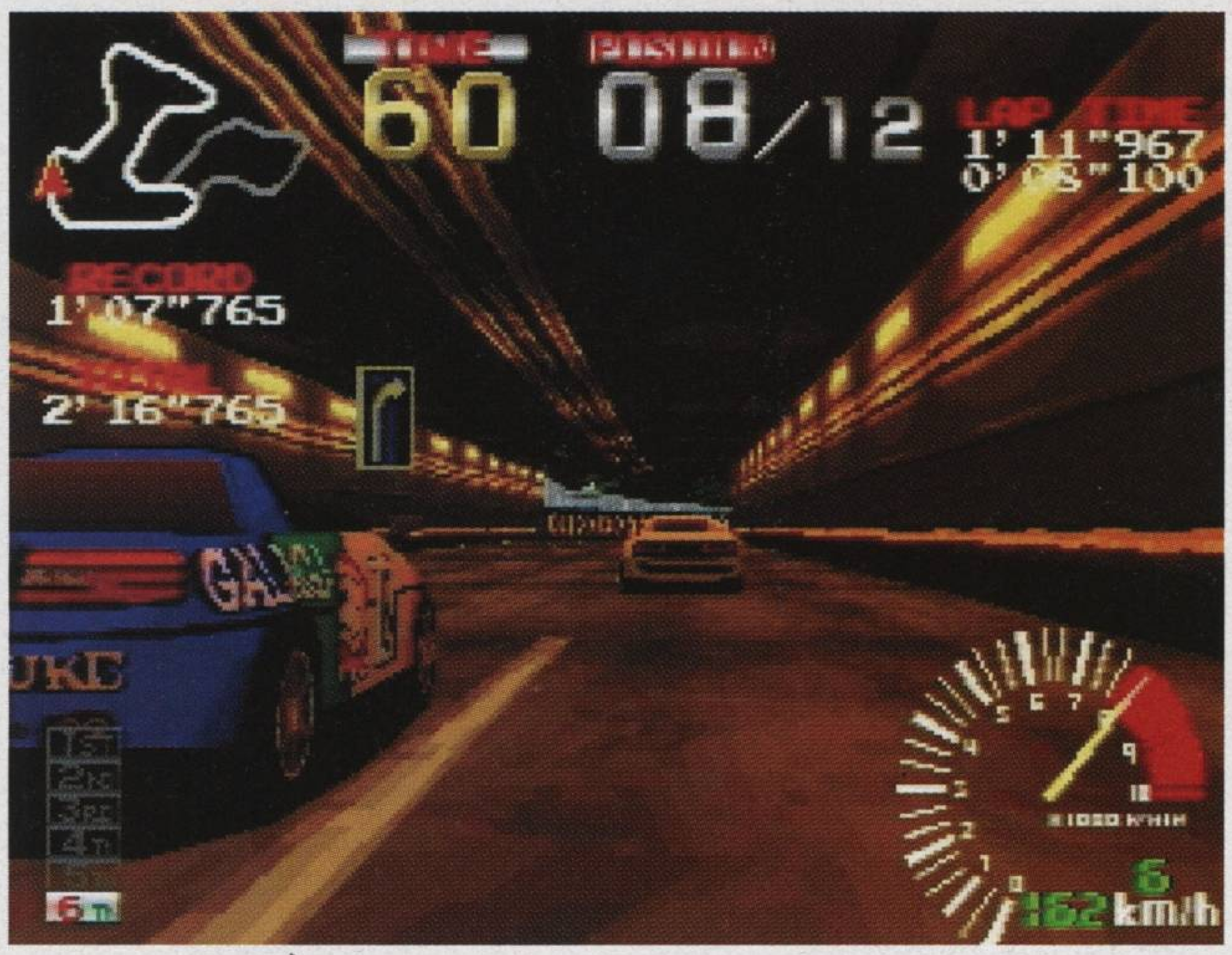


Send your **questions** to Q&A, **Edge**, 30 Monmouth Street, Bath, Avon BA1 2BW

Q **1.** Why black discs for the PlayStation? Are they cheaper to manufacture? I thought that CDs had to be silver to reflect the laser.
2. Why do they release consoles in Japan a year before everywhere else? It's the same console, so why keep us waiting?
3. One magazine claims that there is a mirror option for the track in *Ridge Racer*. Is this true?
4. Where do importers get off charging nearly three times the retail price for the Saturn and PlayStation? If people stopped and thought before paying these ridiculous prices, they would have to be reduced.
5. How can I get hold of a copy of 'Video PlayStation, as shown on page 9, issue 16 of your most excellent magazine?

J Rowland Tullett,
Cheshire

A **1.** PlayStation CDs are black for two reasons. Firstly, Sony wanted to distinguish their games from normal CDs, so they applied a black dye to the plastic on the side of the CD that is read by the laser. And it's also possibly an attempt to prevent piracy – disturbingly, bootleg copies of 3DO and Saturn games are already being circulated by some shops and mail-order firms.
2. Japanese companies usually roll out their hardware in their home market first. And besides, it's never exactly the same machine – the PAL TV standard means that a modification (switching the video display from 60Hz to 50Hz) is necessary.
3. Yes, it is true. Before leaving the slip road, turn and speed towards the wall at the end. You'll emerge and everything will be reversed – left-hand turns become right-handers, etc.
4. In the case of the PlayStation, the prices that are being charged (£600-700) are almost justified. Sony has a limited number of machines available in Japan, and exports are actively discouraged. The upshot of this is that very few units are being channelled to UK importers from traditional sources like Hong Kong. Those that have made the journey are often sold at huge mark-ups (wholesale prices of £500-600 are not uncommon), simply because it's a sellers' market – everyone wants PlayStations and no-one can get hold of them. When more distribution channels open up and machines enter the UK in greater numbers, the price should settle to a more acceptable level – but it might take longer than with the SFC or Saturn.
5. This video was released for the launch of the PlayStation. Sony distributed it at the recent conference attended by **Edge** (issue 16) and also mail-shot it to 300,000 Japanese consumers. Sadly, there's no easy way to get hold of it, although you might have caught a glimpse of it on the GamesMaster TV show – apparently some early clips of *Ridge Racer,* etc were shown.



The quality of *Ridge Racer*'s visuals is only matched by its soundtrack. The self-proclaimed 'Tipstar' wants to know where he can get it from

Q **1.** How can I get hold of the awesome *Ridge Racer* soundtrack? Will Namco release it on a CD album?
2. How early does **Edge** receive some of the news and how long before the magazine goes onsale do you finish it? In a future issue, how about doing a special on how **Edge** is produced?

'Tipstar',
NSW, Australia

A **1.** Namco has released two CDs of the music from *Ridge Racer* – one from the first coin-op and another from the sequel (the PlayStation game has all the tracks from the first game). For game music CDs, try one of the importers advertising at the back of this magazine – from time to time companies bring them over.
2. The magazine generally gets finished a couple of weeks before it goes onsale. Most of the big news stories tend to turn up late in the issue, which means that **Edge** occasionally sails past its deadline and the magazine arrives on the shelves a day or so later than planned. But you can bet that there'll be an exclusive story in the bag to make up for it.

David O'Neill is looking for a replacement for the 3DO's rather unforgiving standard pad

Q **1.** Will Nintendo be bringing out an equivalent to Sega's 32X? If so, what format will it be: cartridge like the 32X or CD-based like the Mega CD?
2. In a past issue of **Edge** you mentioned a device which enables 3DO owners to play PC CD-ROM games on their consoles. Do you have any more info on this, as I love the look of *Little Big Adventure?*
3. Does anyone make or plan to make a controller for the 3DO? My thumb hasn't got a print any more and is sore as hell from playing *Super Street Fighter II* and *Way Of The Warrior* on the stupidly stiff pad.

David O'Neill,
Gwent

A **1.** A CD-ROM drive for the Super Famicom is now finished at NCL's labs, and is said to boost the SFC's potential considerably.
2. The device you mean is the 3DO PC card, but it only allows you to play 3DO games on the PC, not vice versa (the 3DO chipset is packed onto a card that you insert into the PC).
3. The 3DO joypad is indeed dreadful. However, there's a fighting stick available and thirdparty pads are on their way, so it might be a good idea to check out your local 3DO specialist or an importer.

Q I have the original Mega Drive and, oddly enough, am thinking of purchasing a 32X. However, I have a problem. As I'm sure you'll understand, the modulator in the Mega Drive is crap, and so

questiontime

I have made my own connections. For the audio I simply use the headphone socket connected via a stereo jack to two phono plugs. For the picture I have found the composite video pin on the 8-pin DIN AV socket at the back of the Mega Drive, and route both picture and sound through my AV amp (with the audio lead acting as the common for the video as well). This gives both a SCART-quality picture and stereo audio.

The problem is that it appears that the 32X uses the AV socket for an extra connection to the base unit, and it looks like you are forced to use the PAL socket on the Mega Drive. I wish to know if this is true or not. If not, how can I get a composite video connection so I can still use it through my amp?

Also, could you tell me roughly when Sega intends to officially release the Saturn in Britain. Some people say next September, but if, as **Edge** suggests, it is in spring '95, I may not even bother with the 32X and wait until then.

David Baumann, Dunstable

The 32X relies on a bewildering range of connections. David Baumann wants to know how to get the best picture from it

A 1. The 32X connects via a lead that plugs into the Mega Drive's AV DIN socket, but your Mega Drive is still outputting the signal via the modulator – you're just getting a composite version of the signal, which is better than RF but not as good as RGB. The 32X has its own video out DIN socket, which is the same as the one on the Mega Drive 2. Composite, SCART and RF connections are possible, but still only at 50Hz.

The Saturn is actually scheduled to appear in Britain in late 1995.

Q I purchased a Sega Mega CD earlier this year and I've been very impressed with the new graphics hardware which endows the hardware with some very nice special effects.

From most magazines, I got the impression that the ASIC hardware in the Mega CD was only capable of effects like sprite scaling, two-axis rotation and sprite stretching, but while skipping through the levels of *Earnest Evans*, one of the first Mega CD games, I noticed some other effects which were very similar to those offered by the SNES's PPU. Things like transparent colours (alpha channel effects) and that swirly background effect usually associated with end-of-level bosses in SNES games. Also, in *Batman Returns*, the programmer has made a Mode 7-style floor ripple and undulate, but I've never seen the SNES do this. What I want to know is:

1. Are all these effects produced by the Mega CD hardware, or the product of fancy routines?
2. Is the ASIC hardware capable of producing a close conversion of Sega's bestselling *Out Run* coin-op?
3. Finally, does the Mega CD's processor work in tandem with the Mega Drive's? If it doesn't, what is the Mega Drive's processor doing while Mega CD games are being played?

Eugene Odeluga, London

A 1. Effects like transparent colours (what are technically known as highlight/shadow modes) are actually part of the Mega Drive's hardware. The SNES has 8bit colour layering in hardware, which is better, and its PPU can also ripple a Mode 7 floor like the Mega CD can – it just takes more time to calculate.
2. Due to speed and colour limitations, a perfect version isn't possible. However, Mega CD experts like Core Design, for example could probably produce a pretty faithful conversion.
3. Yes, both processors run in parallel, and the ASIC hardware also works in conjunction with the Mega CD's CPU (a 68000 running at 12.5MHz).

Q 1. With the revelation that PlayStation *Ridge Racer* will sell for £35, are we to assume that Sega and Nintendo will drastically slash their prices for a summer clear-out? *Super SFII* for £20?
2. Am I correct in saying that the Ultra 64, like the Jaguar, offers 32bit graphics and 32bit sound? If so, how do the two machines compare (or is the Ultra 64 still shrouded in too much secrecy)? Is there a discernable difference between 16bit and 32bit sound to anyone but the dedicated audiophile? I'm normally too busy playing the games to sit back and soak in the soundtrack…
3. Why do Japan and the USA treat the European market like a second-rate leper colony? Companies like Code Masters, Rare and Delphine helped produce the three most outstanding games of recent times (*Micro Machines*, *Donkey Kong Country* and *Flashback*), yet we still have to wait for new hardware, and the best software can take up to a year to reach these shores.

Shawn Orlando Seabrook, Stevenage

A 1. The arrival of the PlayStation in Japan has been met with enthusiasm because its CD software vastly undercuts the price of cartridge games. It is possible that next summer the UK will see some price reductions on stocks of cartridge software, although whether CD games will be as cheap in the UK, is a matter of conjecture.
2. The Ultra 64 will be the only console with a true 64bit graphics chip – the Jaguar's architecture is composed of two 32bit chips commanding a 64bit bus bandwidth. The Ultra 64's sound specifications are still unknown at this stage.
3. A variety of reasons, but mainly because it's traditional for Japanese companies to enter their home markets first – it's the same for most Japanese consumer electronics products. Quite often the massmarket consumer simply isn't prepared for the launch of new hardware. While UK magazines such as **Edge** generate a certain amount of interest in products like the PlayStation, Sony isn't convinced that the games market over here is ready for the machine – and, more importantly, there isn't enough decent software to support a launch.

Q I read in your magazine a few issues ago that the Ultra 64 would be compatible with HDTV for higher resolution. Will it also be compatible with PC monitors? This would be a good idea as many people have them.

Gareth Stevenson, Coalville

A The Ultra 64 is likely to be compatible with HDTV, but the chance of any software being programmed to take advantage of this is minimal – HDTV TVs, which run on the MUSE system, are only onsale in Japan in very limited numbers. On the other hand, it's safe to say that the machine won't be compatible with PC monitors.

Q and A

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Next month **Edge** chronicles the Apple phenomenon and looks at the company's plans for the future.

Issue **nineteen**

Thursday 23 February

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